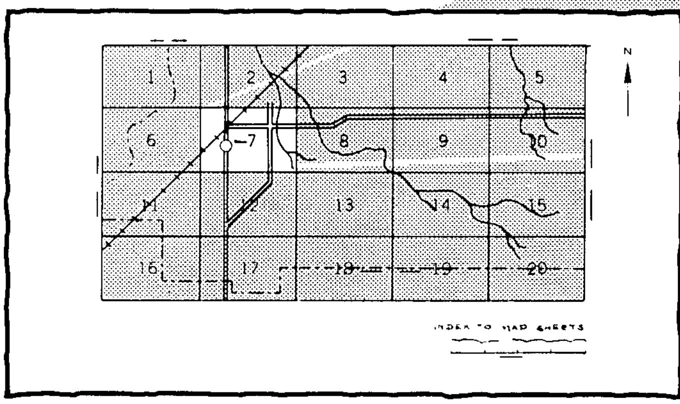
# SOIL SURVEY OF

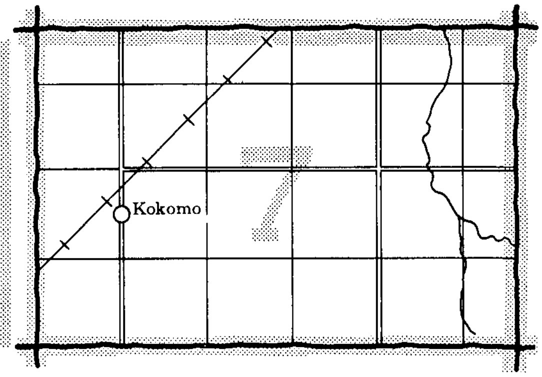
# Webster County, Mississippi

United States Department of Agriculture
Soil Conservation Service
In cooperation with the
Mississippi Agricultural and Forestry Experiment Station

# HOW TO USE

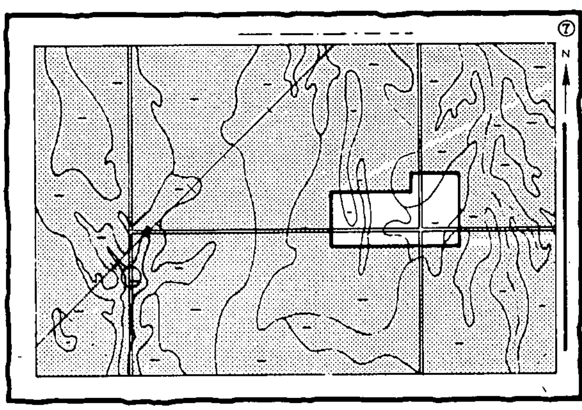
1. Locate your area of interest on the "Index to Map Sheets" (the last page of this publication).

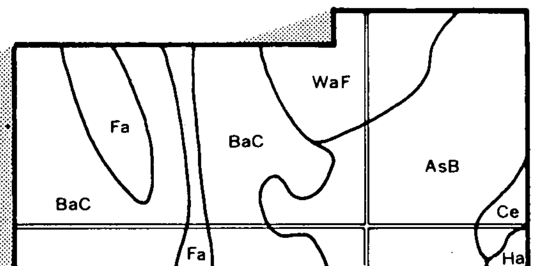


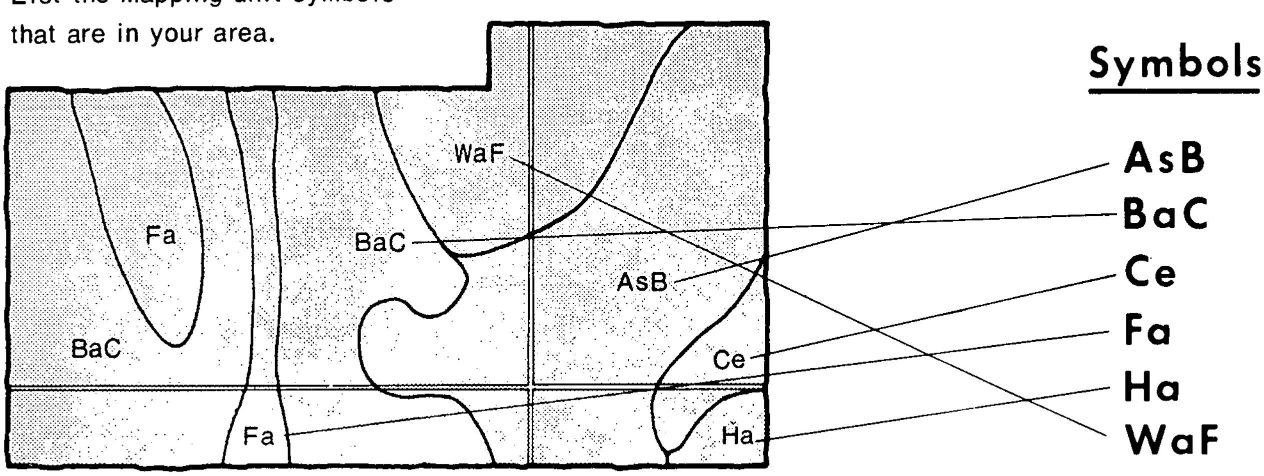

2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.



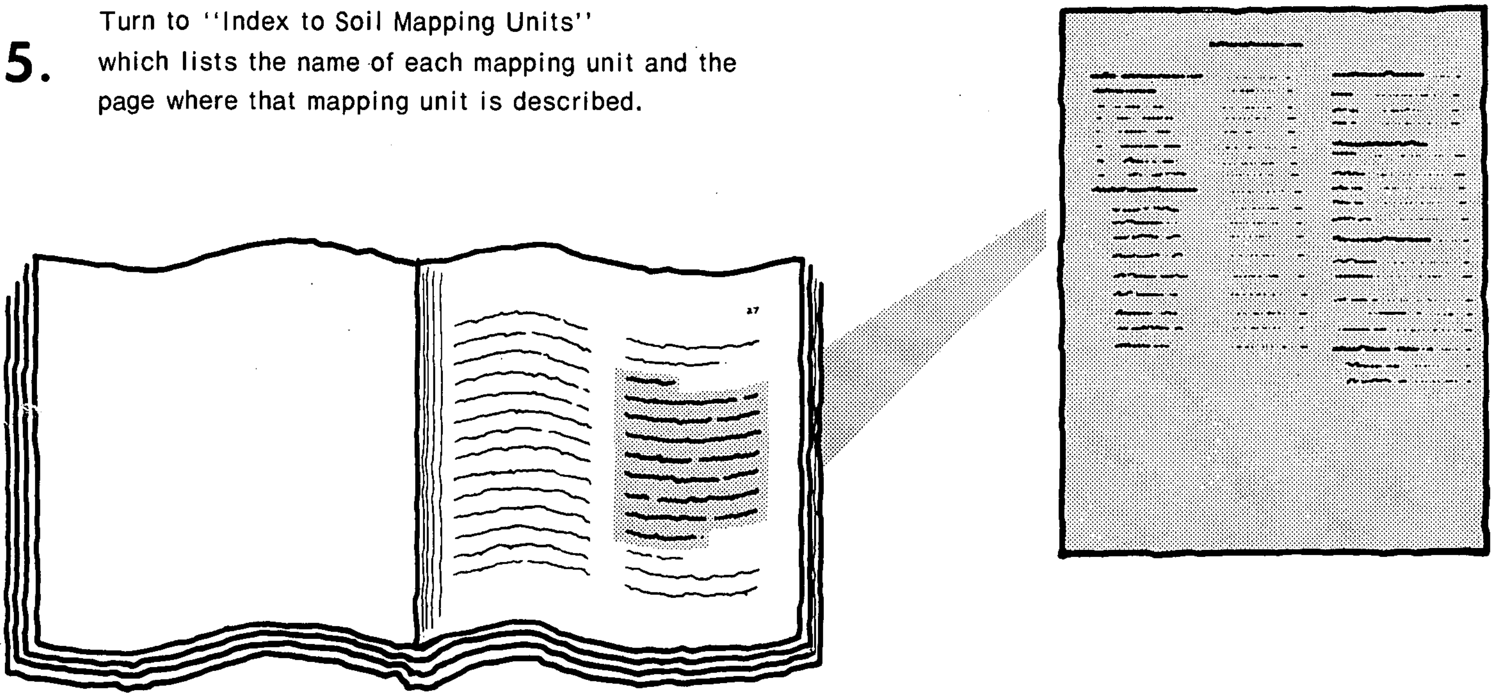




4. List the mapping unit symbols that are in your area.

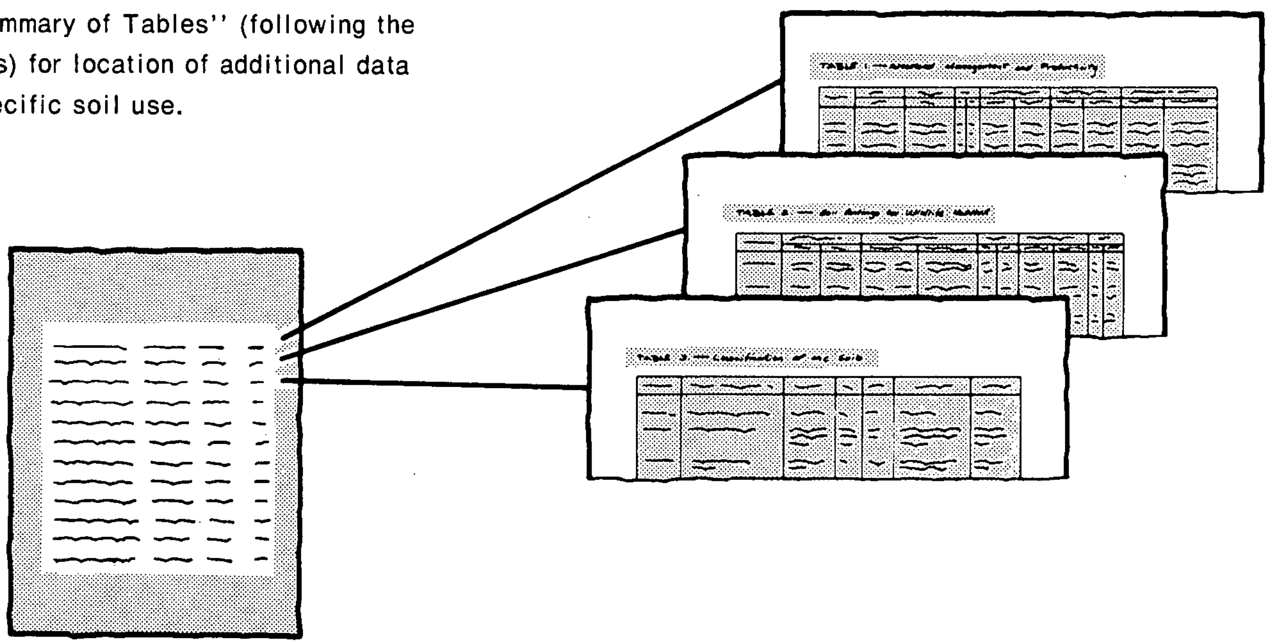


# THIS SOIL SURVEY

**5.** Turn to "Index to Soil Mapping Units" which lists the name of each mapping unit and the page where that mapping unit is described.



**6.** See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



**7.** Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; to specialists in wildlife management, waste disposal, or pollution control.

This is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and agencies of the States, usually the Agricultural Experiment Stations. In some surveys, other Federal and local agencies also contribute. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in the period 1967-74. Soil names and descriptions were approved in 1974. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1975. This survey was made cooperatively by the Soil Conservation Service and the Mississippi Agricultural and Forestry Experiment Station. It is part of the technical assistance furnished to the Webster County Soil Conservation District.

Soil maps in this survey may be copied without permission, but any enlargement of these maps could cause misunderstanding of the detail of mapping and result in erroneous interpretations. Enlarged maps do not show small areas of contrasting soils that could have been shown at a larger mapping scale.

**Cover: Floodwater retarding dam in Bogue Creek Watershed.**

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Issued June 1978

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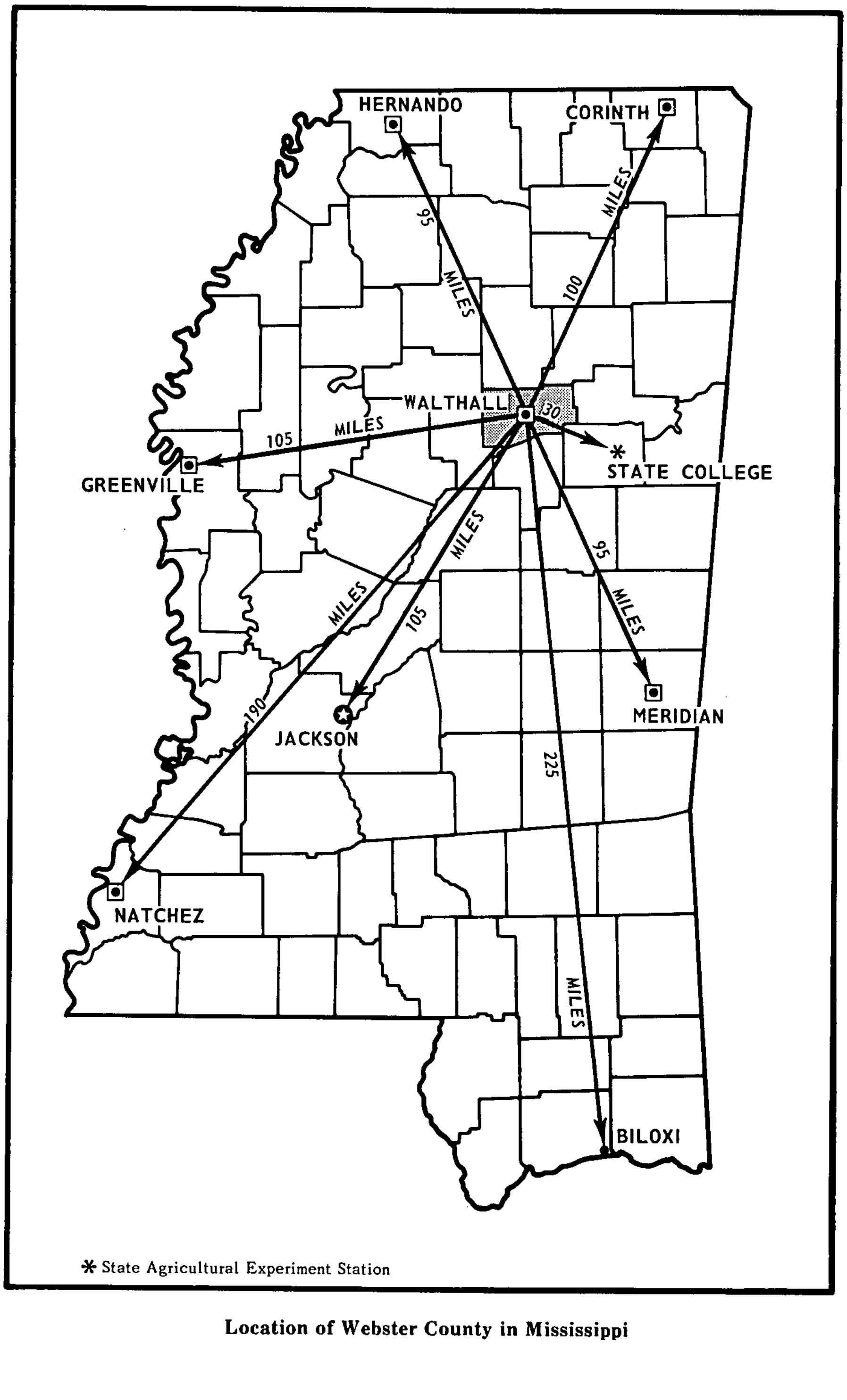
# Summary of Tables

Summary of Tables—Continued




Location of Webster County in Mississippi

# SOIL SURVEY OF WEBSTER COUNTY, MISSISSIPPI

By J. W. McMullen and J. G. Ford, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service, in cooperation with the Mississippi Agricultural and Forestry Experiment Station

WEBSTER COUNTY, in northeast-central Mississippi (see facing page), has a land area of 266,240 acres, or 416 square miles. It is bordered on the north by Calhoun and Chickasaw Counties; on the east by Clay and Oktibbeha Counties; on the south by Choctaw, Montgomery, and Oktibbeha Counties; and on the west by Grenada and Montgomery Counties. By air, Walthall, the county seat, is about 106 miles northeast of Jackson, the State capital, and about 30 miles west of Mississippi State University.

The climate of the county is moist and subtropical. The winters are mild, and the summers are warm and humid.

The county is dominantly agricultural, though industry is increasing. Cotton, soybeans, corn, and grain sorghum are the main crops. Other sources of farm income are beef cattle, dairying, and wood products. More than half of the acreage is in forest. Some of the people who live on the farms work in nearby industries and are part-time farmers.

## General Nature of County

This section is primarily for those not familiar with the county. It describes physiography, drainage, relief, history and development, climate, and agriculture.

### Climate

Webster County is in a subtropical area where alternately warm moist air moves northerly from the Gulf of Mexico, and cold drier air moves southerly. The transitions from one to another are frequently accompanied by abrupt weather changes. Table 1 shows data on temperature and precipitation. Table 2 shows the probability of low temperatures in spring and fall. These data, from Winona in adjacent Montgomery County, are representative of Webster County.

Summers are consistently warm. Temperatures of 90 degrees or higher have occurred as early as May 2 and as late as October; the number of days in a year with temperature that warm has ranged from more than 90 to less than 35. Occasionally during the warmer season the pressure distribution alters to bring westerly to northerly winds. When this change is extended, it results in a period of drier hot weather. There have been periods up to over a month when no measurable rain has fallen.

Rainfall is generally of the shower type. Prolonged rains are not frequent and usually occur in the winter and spring, often as a result of warm, moist gulf air overriding a mass of cold air at the surface. In the late fall, winter, and early spring, thunderstorms may occur at any hour and are more apt to be attended by higher winds than in the summer. Thunderstorms are only occasionally accompanied by hail. Most of the hail reported was less than an inch in diameter. Excessive rainfall, more than one quarter of an inch in 5 minutes, may occur in any season. Rainfall of more than 3 inches in a day may occur in any month and cause local flash flooding. Occasionally torrential rain occurs.

During the colder part of the year, the usual weather cycle is rain followed by a few days of relatively warm balmy days and then by another rain. Some years may go by with no snowfall or amounts too small to measure. The heavier snowfalls are infrequent and seldom remain on the ground more than 2 or 3 days. Cold spells are generally of short duration. The ground freezes occasionally, but not to a great depth, and it generally thaws rapidly. Temperatures of 32 degrees or colder have occurred as early in the fall as October 20 and as late in the spring as April 19. See table 2. The number of days in a year with temperatures of 32 degrees or colder ranges from more than 90 to less than 40. On an average of about 2 days in a year, the temperatures do not rise above 32 degrees all day.

Winds blow from the south quadrant for more hours than from other similar sectors of the compass. The speed of the wind is generally under 10 miles an hour. Windspeeds of about 45 miles an hour or more are estimated to have a mean recurrence interval of about 2 years in the county. A sustained windspeed of nearly 70 miles an hour 30 feet above ground has a mean recurrence interval of about 50 years in most of Webster County.

Temperatures were measured in a standard Weather Bureau instrument shelter with the thermometer 4 1/2 feet above ground. On clear, calm nights, the shelter level temperature usually will be several degrees warmer than the air near the ground. Under these conditions, frost could form on vegetation at ground levels even though the temperature in the shelter is above 32 degrees. The length of the freeze-free period, between the last 32 degrees temperature in spring and the first 32 degrees temperature in fall, 210 days, is the length of the growing season. The effect of temperature varies according to the kind, type, and variety of vegetation. These data are based on 15 to 18 years of record during February 1953-December 1970 and have been adjusted, where necessary, for seasons not having temperature as low as the indicated threshold. Data are applicable to most of the agricultural part of Webster County.

## Physiography, Drainage, and Relief

Webster County lies almost entirely within the Coastal Plain physiographic province. The Flatwoods, a strip only a few miles wide along the eastern side of the county, marks the outcrop of impervious clays of the Porters Creek Formation of the Midway Group. Most of the county is developed dominantly on sandy materials which make up the Naheola Formation of the Midway Group, the Fern Springs and Ackerman Formations of the Wilcox Group, and the Meridian Formation of the Claiborne Group (*17*).

The landscape is rolling and hilly and is broken by level strips of bottom land along the streams.

The northern third or more of Webster County, except the eastern end, is in the Yalobusha River drainage basin. The main tributaries of the Yalobusha in Webster County are Shutispear, Sabougla, and Lindsay Creeks, which flow northwest. The southern two-thirds of the county or slightly less, except the eastern end, is in the Big Black River drainage basin. The chief tributaries of the Big Black are, in east-west order: Spring Creek, Little Black Creek, Salt Creek, Calabrella Creek, and Wolf Creek, all southward flowing. The streams of the eastern part of the county flow east and southeast to Line Creek, part of the Tombigbee River system. All the creeks named have numerous tributaries.

The relief of Webster County ranges from nearly level in the flood plains to steep in the hills. Altitudes range from a minimum of about 230 feet above sea level near the county line in the northwestern part along State Highway 404, to a maximum of 618 feet above sea level at a point about 3 miles east of Bellefontaine near the headwaters of Sabougla Creek.

## History and Development

Webster County, in northeast-central Mississippi, was established April 6, 1874, under the name of Sumner County, and was organized from parts of Chickasaw, Choctaw, Montgomery, and Oktibbeha Counties. On January 30, 1882, its name was changed to Webster, in honor of the great statesman Daniel Webster. The old boundary between the Choctaw and Chickasaw cessions cuts across its northeast corner.

Walthall, the county seat of Webster County, was named in honor of General Edward C. Walthall, the distinguished Confederate leader. The original county seat was at the old town of Greensboro, a few miles to the southwest of Walthall, and for many years the county seat of Choctaw County. The courthouse at Greensboro was burned in 1871.

Webster County has not increased in population, from the first census taken in 1880 to the present. In 1880 its population was 9,534; in 1900, 13,619; in 1920, 12,644; in 1950, 11,607; in 1960, 10,580; in 1970, 10,047. Eupora, which is by far the largest town in Webster County, had a population of 1,792 in 1970. Other than Eupora, there are four incorporated towns in the county: Walthall with a population of 161, Mathiston with a population of 570, Maben with a population of 862, and Mantee with a population of 142.

## Agriculture

Little is known about the earliest agriculture in the county. Indians grew corn, although they obtained most of their food by hunting and fishing. The first settlers grew corn, peas, beans, potatoes, and other crops for their own use.

In the 1800's cotton was grown extensively. Cotton is still the most important cash crop in the county, but its acreage has decreased since acreage was restricted in the 1930's. Soybeans and timber are other important cash crops in the county. In recent years farming has become more diversified. Of increasing importance are livestock, particularly beef cattle, and as feed for the livestock, corn, pasture, and small grain.

# How This Survey Was Made

Soil scientists made this survey to learn what kinds of soil are in the survey area, where they are located, and how they can be used. The soil scientists went into the area knowing they likely would locate many soils they already knew something about and perhaps identify some they had never seen before. They observed the steepness, length, and shape of slopes, the size of streams and the general pattern of drainage, the kinds of native plants or crops, the kinds of rock, and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has been changed very little by leaching or by the action of plant roots.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those

in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. The *soil series* and the *soil phase* are the categories of soil classification most used in a local survey.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Soil series commonly are named for towns or other geographic features near the place where they were first observed and mapped. Arkabutla and Maben, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in characteristics.

Soils of one series can differ in texture of the surface layer and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Providence silt loam, 0 to 2 percent slopes, is one of several phases within the Providence series.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, trees, and other details that help in drawing boundaries accurately. The soil map in the back of this publication was prepared from the aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning the management of farms and fields, a mapping unit is nearly equivalent to a soil phase. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a named soil phase.

Some mapping units are made up of soils of different series, or of different phases within one series, and some have little or no soil. These kinds of mapping units are discussed in the section "Soil Maps for Detailed Planning."

While a soil survey is in progress, samples of soils are taken as needed for laboratory measurements and for engineering tests. Existing ratings of suitabilities and limitations (interpretations) of the soils are field tested and modified as necessary during the course of the survey, and new interpretations are added to meet local needs. This is done mainly through field observations of behavior of different kinds of soil for different uses under different levels of management. Also, data are assembled from other sources, such as test results, records, field experience, and other information available from state and local specialists. For example, data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized to be readily useful to different groups of users, among them farmers, managers of rangeland and woodland, engineers, planners, developers and builders, homebuyers, and those seeking recreation. Presenting the detailed information in an organized, understandable manner is the purpose of this publication.

## Soil Map for General Planning

The general soil map at the back of this publication shows, in color, the soil associations described in this survey. Each soil association is a unique natural landscape unit that has a distinctive pattern of soils and relief and drainage features. It normally consists of one or more soils of major extent and some soils of minor extent, and it is named for the major soils. The kinds of soil in one association may occur in other soil associations, but in a different pattern.

The map provides a broad perspective of the soils and landscapes in the survey area. It provides a basis for comparing the potential of large areas of the county for general kinds of land use. From the map, areas that are generally suitable for certain kinds of farming or other land uses can be identified. Likewise, areas with soil properties distinctly unfavorable for certain land uses can be located.

Because of the small scale of the map, it does not show the kind of soil at a specific site. Thus, this is not a suitable map for planning the management of a farm or field or for selecting the exact location of a road, building, or similar structure because the kinds of soils in any one soil association ordinarily differ from place to place in slope, depth, stoniness, drainage, or other characteristics that affect their management.

The soil associations in the survey area vary widely in their potential for major land uses, as indicated in table 3. General ratings of the potential of each soil association, in relation to the other soil associations, are given for each major land use. Adverse soil properties that pose limitations to the use are indicated. The ratings of soil potential assume that practices in common use in the county are used to overcome soil limitations. These ratings reflect the relative ease of overcoming such soil limitations and the probability of soil related problems persisting after such practices are adapted. The ratings do not consider location in relation to existing transportation systems or other kinds of facilities.

### 1. Chenneby-Urbo Association

*Deep, nearly level somewhat poorly drained soils that have a silty and clayey subsoil*

This association is on the flood plains in the eastern part of the county. It occupies about 2 percent of the county. About 47 percent of the area is Chenneby soils, 35 percent is Urbo soils, and the remaining 18 percent is minor soils.

The Chenneby soils are slightly higher and mainly occupy bands adjacent to stream channels. The Urbo soils are on the level flats near the uplands and smaller flood plains. The Chenneby soils have a silt loam surface layer and a silty clay loam subsoil, and the Urbo soils have a silty clay loam surface layer and a silty clay subsoil.

The minor soils in this association are the somewhat poorly drained Arkabutla soils and the well drained Cascilla soils.

About 95 percent of this association is used for cultivated crops and pasture. Occasional flooding causes slight or moderate crop damage. The potential is high for cultivated farm crops and pasture plants. Surface field ditches are needed to remove excess water. The Urbo soils are fairly difficult to work. Grazing may be limited during winter and spring because of wetness. The potential is very high for woodland. Equipment may be restricted in winter because of wetness. The potential is low for residential, industrial, and commercial uses because of flooding and a seasonal high water table. The potential for openland wildlife is fair to good. Limitations for recreational uses other than hunting and fishing are severe.

### 2. Chenneby-Arkabutla Association

*Deep, nearly level, somewhat poorly drained silty soils formed in silty alluvium*

This association is on the broad flood plains along Big Black River and some of its larger tributaries. It occupies about 5 percent of the county. About 39 percent is Chenneby soils, 26 percent is Arkabutla soils, and the remaining 35 percent is minor soils.

The Chenneby soils are slightly higher in most places and mainly occur adjacent to former stream channels. The Arkabutla soils mainly occupy the broad flats. Both soils have a silt loam surface layer, silty clay loam subsoil, and a seasonal high water table.

The minor soils in this soil association are the poorly drained Guyton and Bonn soils, the moderately well drained Oaklimeter soils, and the well drained Cascilla soils.

Almost half of the association is used for hardwood forest and the rest for pasture and cultivated crops. Frequent flooding is the main limitation to the use of the soils for farming and most other purposes.

This association has a high potential for cultivated farm crops and pasture plants. To achieve this potential, a complete drainage system and protection from flooding are required. Grazing may be limited during winter and spring because of wetness. The potential is very high for woodland. Equipment may be restricted in winter and spring because of wetness. Soil wetness is so severe and difficult to overcome that the potential for residential, industrial, and commercial use is low. The potential for wetland wildlife is fair. Limitations for recreational uses other than hunting and fishing are severe.

### 3. Chenneby-Oaklimeter-Cascilla Association

*Deep, nearly level, somewhat poorly drained, moderately well drained, and well drained silty soils formed in silty alluvium*

This association is on the flood plains in the northern part of the county. It occupies about 6 percent of the county. About 34 percent is Chenneby soils, 20 percent Oaklimeter soils, 11 percent Cascilla soils, and the remaining 35 percent is minor soils.

The Chenneby and Oaklimeter soils occur throughout the area. The Cascilla soils are slightly higher in most places and mainly occupy bands adjacent to stream channels. These soils have a silt loam surface layer. The Chenneby soils have a silty clay loam subsoil and Oaklimeter and Cascilla soils have a silt loam subsoil.

The minor soils in the association are the somewhat poorly drained Arkabutla and Urbo soils and the well drained Jena and Ariel soils.

Most of this association is open land used for cultivated crops and pasture. A small acreage is wooded. Occasional flooding causes slight crop damage. The potential is high for cultivated farm crops and pasture plants. Surface field ditches are needed to remove excess water from fields. Grazing may be limited during winter and spring because of wetness. The potential is very high for woodland. Equipment may be restricted in winter and spring because of wetness. Because of the flood hazard and seasonal high water table, the potential is low for residential, industrial, and commercial use. The potential for openland wildlife is good. Limitations for recreational uses other than hunting and fishing are moderate to severe.

### 4. Oaklimeter-Ariel Association

*Deep, nearly level, moderately well drained and well drained silty soils*

This association is scattered throughout most of the county. It occupies about 12 percent of the county. About 71 percent is Oaklimeter soils, 8 percent Ariel soils, and the remaining 21 percent is minor soils.

The Oaklimeter soils occur throughout the association. The Ariel soils are slightly higher in most places and mainly occupy bands adjacent to stream channels. These soils have a silt loam surface layer and silt loam subsoil.

The minor soils in this association are the well drained Jena and Cascilla soils, the somewhat poorly drained Bude soils, and the poorly drained Guyton and Ozan soils.

Most of this association is open land used for row crops and pasture. A small acreage is wooded. Slight to moderate crop damage is caused by occasional flooding. The potential is high for crops and pasture plants. In cul-

tivated areas, surface field ditches are needed to remove excess water. Grazing may be limited during winter and spring because of wetness. The potential is very high for woodland. Because of the flood hazard and seasonal high water table, the potential is low for residential, industrial, and commercial use. The potential for openland wildlife is good. Limitations for recreational uses other than hunting and fishing are moderate to severe.

### 5. Sweatman-Providence Association

*Deep, hilly, well drained and moderately well drained soils that have a clayey and silty subsoil*

This association is scattered throughout the county. In the uplands it is dissected by intermittent streams and numerous short drainageways. It has long, narrow ridgetops and sloping to hilly side slopes.

This association occupies about 31 percent of the county. About 40 percent is Sweatman soils, 30 percent Providence soils, and the remaining 30 percent is minor soils.

The Sweatman soils occupy the middle and lower slopes. The Providence soils occupy mainly the ridgetops and upper side slopes. Sweatman soils have a loam surface layer and a silty clay to silty clay loam subsoil. Providence soils have a silt loam surface layer, a silt loam subsoil, and a fragipan at a depth of about 22 inches that restricts plant roots.

The minor soils are the moderately well drained Tippah soils and the well drained Smithdale soils on the uplands and the moderately well drained Oaklimeter soils in the narrow flood plains.

About 70 percent of this association is used for woodland. The narrow flood plains and the sloping sides and ridges are used for cultivated crops and pasture. Because of the steep slopes and erosion hazard, most of this association has low potential for cultivated crops, pasture, and hay. The potential is moderately high for woodland. Management problems are slight to moderate. Selected sites are suitable for residential, industrial, and commercial uses, but because of the steep slopes, most of the association has low potential for these uses. The potential for woodland wildlife is good. Hunting, fishing, hiking, and horseback riding are suitable recreational uses.

### 6. Smithdale-Ora Association

*Deep, hilly, well drained and moderately well drained soils that have a loamy subsoil*

This association is scattered throughout most of the county. In the uplands it is dissected by intermittent streams in narrow valleys and numerous short drainageways. It has long narrow ridgetops and sloping to hilly side slopes.

This association occupies 26 percent of the county. About 36 percent is Smithdale soils, 36 Ora soils, and the remaining 28 percent is minor soils.

The Smithdale soils occupy the side slopes. The Ora soils occupy mainly the ridgetops and upper side slopes. Smithdale soils have a sandy loam surface layer and a sandy clay loam subsoil. Ora soils have a loamy surface layer, a sandy clay loam subsoil, and a fragipan at a depth of about 21 inches that restricts roots.

The minor soils are the well drained Sweatman soils, the moderately well drained Providence and Tippah soils on the uplands, and the moderately well drained Oaklimeter soils on the narrow flood plains.

About 75 percent of this association is wooded. The narrow flood plains, sloping sides, and narrow ridges are used for cultivated crops and pasture. Because of the steep slopes and erosion hazard, most of this association has low potential for cultivated crops, pasture, and hay. The potential is moderately high for woodland. There are no significant management problems. Selected sites are suitable for residential, industrial, and commercial uses, but because of the steep slopes, most of the association has low potential for these uses. The potential for woodland wildlife is good. Hunting, fishing, hiking, and horseback riding are suitable recreational uses.

### 7. Bude-Guyton-Providence Association

*Deep, nearly level and gently sloping, somewhat poorly drained, poorly drained, and moderately well drained soils that have a silty subsoil*

This association is on the uplands and terraces bordering the flood plains of the Big Black River. It occupies about 2 percent of the county. About 33 percent is Bude soils, 18 percent Guyton soils, 18 percent Providence soils, and the remaining 31 percent is minor soils.

The somewhat poorly drained Bude soils occupy the broad flats, and poorly drained Guyton soils are at the lower elevations. The moderately well drained Providence soils commonly occupy the slightly higher elevations on the ridges. These soils have a silt loam surface layer and subsoil. Bude and Providence soils have a fragipan that restricts plant roots.

The minor soils are the moderately well drained Verdun soils, the poorly drained Bonn soils, and the moderately well drained Oaklimeter soils on the narrow flood plains.

About 90 percent of this association is open land used for pasture and row crops. Some parts are flooded occasionally. The potential is high for cultivated farm crops and pasture. Excess water should be removed by row arrangement and field ditches. The Guyton soils and some of the minor soils are fairly to poorly suited for row crops. The potential is high for woodland. Equipment may be restricted in winter and spring because of wetness. The potential is low for residential, industrial, or commercial uses because of wetness and slow percolation. The potential for openland wildlife is fair to good. Limitations for recreational use are moderate to severe.

### 8. Providence-Tippah Association

*Deep, gently sloping to strongly sloping, moderately well drained soils that have a silty upper subsoil*

This association is mostly in the east-central part of the county. It occupies about 8 percent of the county. About 44 percent is Providence soils, 35 percent Tippah soils, and the remaining 21 percent is minor soils. The Providence and Tippah soils occur on the same slope positions on the landscape. Providence soils have a fragipan, and Tippah soils have a clayey lower subsoil.

The minor soils are the somewhat poorly drained Bude soils, the moderately well drained Ora soils, the poorly drained Guyton soils, and the moderately well drained Oaklimeter soils on the narrow flood plains.

About 60 percent of this association is wooded. The potential is moderately high for woodland. There are no significant limitations for woodland use and management. The narrow flood plains, sloping sides, and broader flats are used for cultivated crops and pasture. The potential is medium for cultivated farm crops and high for pasture. Soil erosion is the main limitation. The potential is medium for residential, industrial, or commercial uses. Low strength, slow percolation, and high shrink-swell are the main limitations. The potential for openland and woodland wildlife is good. Limitations for recreational uses are slight to severe.

### 9. Wilcox-Maben-Tippah Association

*Deep, gently sloping to steep, somewhat poorly drained, well drained, and moderately well drained soils that have a clayey and silty subsoil*

This association is on the uplands in the eastern part of the county. It occupies about 8 percent of the county. About 34 percent is Wilcox soils, 26 percent Maben soils, 20 percent Tippah soils, and the remaining 20 percent is minor soils. Wilcox and Tippah soils occupy the gently sloping ridges and sloping sides. The Maben soils are on the steep side slopes. Tippah soils have a silty upper subsoil over a clayey lower subsoil.

The minor soils are the somewhat poorly drained Falkner and Longview soils and the moderately well drained Ora and Prentiss soils.

About 80 percent of this association is used for woodland. Some of the sloping sides and ridges are used for pasture and crops. The potential is low for cultivated farm crops, pasture, and hayland. The soil slope and erosion hazard are the main limitations. The potential is moderately high for woodland. Limitations for woodland use and management are slight to moderate. The potential is low for residential, industrial, and commercial uses. The potential is fair to good for openland wildlife and good for woodland wildlife. Hunting, fishing, and horseback riding are suitable recreational uses.

## Land Use Considerations

The soil associations in the county vary widely in their potential for major land uses, as indicated in table 3. For each land use, general ratings of the potential of each soil association, in relation to the other soil areas, are indicated. Kinds of soil limitations are also indicated in general terms. The ratings of soil potential reflect the relative cost of such practices, and also the hazard of continuing soil related problems after such practices are installed.

Kinds of land uses considered include cropland, pasture, woodland, urban, recreation, and wildlife. Cultivated farm crops grown extensively include cotton, soybeans, and corn. Woodland refers to land in trees. Urban uses include residential, commercial, and industrial land uses. Recreation includes nature study area trails, camping, and picnicking.

This county is generally an agricultural county, with a small acreage used for urban development. Eupora, Mathiston, Maben, Mantee, and Walthall are the principal towns with urban development. Much of the county is well suited to cropland and pasture. In general, in the survey area, the upland soils well suited to crops are also suited for urban development. All the soils on the flood plains and in the Bude-Guyton-Providence association have a very high potential for woodland. The other upland areas have moderately high potential for woodland.

All the soil associations except those on the flood plains have medium potential for recreation. Potentials for wildlife are discussed in the section "Planning the Use and Management of Soils."

Soil information can be used as a guide in planning the orderly growth and development of the county. It is especially helpful in determining which lands to allocate to each use.

## Soil Maps for Detailed Planning

The kinds of soil (mapping units) shown on the detailed soil maps at the back of this publication are described in this section. These descriptions together with the soil maps can be useful in determining the potential of soil and in managing it for food and fiber production, in planning land use and developing soil resources, and in enhancing, protecting, and preserving the environment. More detailed information for each soil is given in the section "Planning the Use and Management of Soils."

Preceding the name of each mapping unit is the symbol that identifies the unit on the detailed soil map. Each mapping unit description includes general facts about the soil and a brief description of the soil profile. The potential of the soil for various major land uses is estimated. The principal hazards and limitations are indicated, and the management concerns and practices for the major uses are discussed.

A mapping unit represents an area on the landscape and consists of a dominant soil or soils for which the unit is named. Most mapping units have one dominant soil, but some have two or more dominant soils. A mapping unit commonly includes small, scattered areas of other soils. The properties of some included soils can differ substantially from those of the dominant soil or soils and thus greatly influence the use of the dominant soil. How the included soils may affect the use and management of the mapping unit is discussed.

The acreage and proportionate extent of each mapping unit are given in table 4, and additional information on each unit is given in interpretive tables in other sections (see "Summary of Tables"). Many of the terms used in describing soils are defined in the Glossary.

## Soil Descriptions and Potentials

**Ae—Ariel silt loam.** This deep, well drained soil is on scattered flood plains throughout the county. Slopes are 0 to 2 percent.

Typically the surface layer is dark brown silt loam about 6 inches thick. It is underlain by dark yellowish brown silt loam that is about 24 inches thick and has brown mottles in the lower part. The next layer about 28 inches thick is silt loam mottled in shades of brown and gray. Below this to a depth of 65 inches is gray silt loam with brownish mottles.

Small areas of Arkabutla, Cascilla, and Oaklimeter soils are included in this mapping unit.

The soil is medium to very strongly acid. Permeability is moderately slow. Runoff is slow. Available water capacity is very high. Approximately 95 percent of the acreage is cultivated or used for pasture. The rest is in woodland.

This soil has a high potential for row crops, pasture, and hay. It has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is deep and is easily penetrated by plant roots. Crop residue should be shredded and left on the surface as a mulch to reduce crusting. Overflow is a hazard for short periods in late winter or early spring. Slight or moderate crop damage may result if overflows occur during the crop growing season. In most fields surface drains and rows should be arranged to remove excess surface water. Some areas need diversions to control water from adjacent hills.

This soil has a very high potential for cherrybark oak, eastern cottonwood, loblolly pine, sweetgum, water oak, and yellow poplar. There are no significant limitations for woodland use or management.

This soil has a low potential for urban uses because of the flood hazard. Capability unit IIw-1; woodland suitability group 1o7.

**Ak—Arkabutla silt loam.** This deep, somewhat poorly drained soil is on scattered flood plains throughout the county. Slopes are 0 to 2 percent.

Typically the surface layer is dark brown silt loam that has grayish mottles and is about 6 inches thick. It is underlain by dark brown silt loam that has grayish and brownish mottles and is about 4 inches thick. The next 8 inches is silty clay loam mottled in shades of gray and brown. Below this is light brownish gray or gray silt loam or silty clay loam mottled in shades of brown to a depth of 60 inches.

Small areas of Chenneby, Guyton, Oaklimeter, and Urbo soils are included in the mapping unit. Also included are some areas on the Big Black flood plains and lower tributaries that are flooded frequently.

The soil is strongly acid or very strongly acid. Permeability is moderate. The available water capacity is high. Runoff is slow.

Approximately 90 percent of the acreage is cultivated or used for pasture. The rest is in woodland. This soil has a high potential for row crops, pasture, and hay. The addition of crop residue helps prevent crusting and packing. Row arrangement and surface field ditches are needed to remove excess surface water. Seedbed preparation and tillage are sometimes delayed as a result of wetness. Occasional flooding causes slight to moderate crop damage.

This soil has a very high potential for cherrybark oak, eastern cottonwood, green ash, loblolly pine, sweetgum, and American sycamore. Wetness is the main limitation to equipment use in managing and harvesting the tree crop, but can be overcome by using special equipment and by logging during the drier seasons.

This soil has a low potential for urban use because of wetness and flood hazard. Capability unit IIw-2; woodland suitability group 1w8.

**Bo—Bonn silt loam.** This deep, poorly drained soil is on terraces, generally in areas of low relief. Slopes are 0 to 2 percent.

Typically the surface layer is about 5 inches of light brownish gray silt loam with dark brown and light gray mottles underlain by about 15 inches of gray silt loam with brownish mottles. The next layer is light brownish gray silt loam with brownish mottles or mottles in shades of gray and brown to a depth of 70 inches.

Small areas of Guyton and Verdun soils are included. These included soils make up 10 to 20 percent of this mapping unit.

The soil is medium acid to strongly alkaline. Permeability is very slow. The available water capacity is medium. Runoff is slow.

Approximately 75 percent of the acreage is used for pasture and row crops. The rest is in woodland. This soil has a low potential for row crops, pasture, and hay. The high content of sodium restricts plant growth. The seasonal high water table is near the surface.

This soil has low potential for woodland. Woodland management concerns are severe.

This soil has low potential for urban uses because of wetness. Capability unit IVs-1; woodland suitability group 5t0.

**Br—Bruno sandy loam.** This deep, excessively drained soil is on flood plains. Slopes are 0 to 2 percent.

Typically the surface layer is about 3 inches of dark brown sandy loam with yellowish brown mottles underlain by about 4 inches of yellowish brown sandy loam. The 7 to 21 inch layer is strong brown loamy sand with thin layers of yellowish red silty material. The next 10 inches is yellowish red sandy loam with pockets of brown silty material. Below this is a 12-inch layer of yellowish red loamy sand with brownish yellow mottles. It is underlain by strong brown sand to a depth of about 60 inches.

Small areas of Jena and Oaklimeter soils are included in the mapping unit. These included soils make up 10 to 20 percent of the mapping unit.

The soil is strongly acid to neutral. Permeability is rapid. The available water capacity is low.

This soil has low potential for row crops and medium potential for hay and pasture. Yields are usually low. The soil is droughty. It is occasionally flooded. Fertilizers leach easily and frequent applications are needed.

This soil has high potential for cherrybark oak, shumard oak, chestnut oak, willow oak, sweetgum, and yellow poplar. Limitations for woodland use and management are moderate.

This soil has low potential for most urban uses. Flood hazard is the main limitation. Capability unit IIIs-1; woodland suitability group 2s5.

**BuA—Bude silt loam, 0 to 2 percent slopes.** This deep, somewhat poorly drained soil is on broad uplands and terraces.

Typically the surface layer is dark yellowish brown silt loam about 6 inches thick. It is underlain by yellowish brown silt loam that is about 10 inches thick and has grayish mottles in the lower part. Below this to a depth of about 72 inches is a firm, compact, and brittle fragipan. The upper part is silt loam mottled in shades of gray and brown; the next part, to a depth of 57 inches, is gray with brownish mottles; and the lower part is silty clay loam mottled in shades of brown and gray.

Small areas of Providence and Guyton soils are included in the mapping unit.

This soil is medium acid to very strongly acid. Permeability is moderate in the upper subsoil and slow in the fragipan. Runoff is slow. Available water capacity is medium.

The soil has high potential for row crops, pasture, and hay. Seedbed preparation and cultivation are sometimes a problem because of the high water table. Crop residue should be shredded and left on the surface as mulch. Row arrangement and surface field ditches are needed.

This soil has high potential for cherrybark oak, Shumard oak, loblolly pine, sweetgum, and yellow poplar. Limitations for woodland use and management are slight to moderate.

This soil has medium potential for most urban uses. Low strength and wetness are the main limitations, but can be overcome by drainage measures, good design, and careful installation procedures. The lower subsoil percs slowly, but this limitation can be partially overcome by increasing the size of the absorption area or by modifying the filter field. Capability unit IIw-3; woodland suitability group 2w8.

**Ca—Cascilla silt loam.** This deep, well drained soil is on scattered flood plains throughout the county. Slopes are 0 to 2 percent.

Typically the surface layer is dark brown silt loam about 9 inches thick. The next layer, to a depth of 42 inches, is dark brown or dark yellowish brown silt loam with grayish mottles in the lower part. Below this is silt loam mottled in shades of gray and brown to a depth of about 60 inches.

Small areas of Arkabutla, Chenneby, and Jena soils are included in the mapping unit.

This soil is slightly acid in the surface layer and strongly acid or very strongly acid below. Permeability is moderate, and runoff is slow. The available water capacity is very high.

Approximately 90 percent of the acreage is cultivated or used for pasture. The rest is in woodland.

This soil has a high potential for row crops, pasture, and hay. The root zone is deep and is easily penetrated by plant roots. Crop residue should be shredded and left on the surface as mulch to reduce crusting. Overflow is a hazard for short periods in late winter or early spring. Slight or moderate crop damage may result if overflows occur during the crop growing season. Row arrangement and surface field ditches (fig. 1) are needed to remove excess surface water.

This soil has very high potential for cherrybark oak, eastern cottonwood, loblolly pine, nuttall oak, sweetgum, American sycamore, and yellow poplar. There are no significant limitations for woodland use or management.

This soil has low potential for urban uses because of the flood hazard. Capability unit IIw-1; woodland suitability group 1o7.

**Ce—Chenneby silt loam.** This deep, somewhat poorly drained soil is on scattered flood plains throughout the county. Slopes are 0 to 2 percent.

Typically the surface layer is dark brown silt loam about 7 inches thick. It is underlain by dark brown silt loam about 7 inches thick. The next layer is dark yellowish brown or dark brown silty clay loam that is about 24 inches thick and has grayish mottles in the lower part. The 38 to 60 inch layer is silty clay loam mottled in shades of brown and gray.

Small areas of Arkabutla, Cascilla, and Urbo soils are included in the mapping unit. Also included are some areas on the Big Black flood plains and lower tributaries that are flooded frequently.

This soil is neutral to very strongly acid in the surface layer and strongly acid to very strongly acid below. Permeability is moderate. The available water capacity is high. Runoff is slow.

This soil has high potential for row crops, pasture, and hay. The root zone is deep and is easily penetrated by plant roots. Seedbed preparation and tillage are sometimes delayed as a result of wetness of the soil. The addition of crop residue helps prevent crusting and packing.

Row arrangement and surface field ditches are needed to remove the surface water. Occasional flooding causes slight to moderate crop damage.

This soil has very high potential for loblolly pine and yellow poplar. Wetness is the main limitation to equipment use in managing and harvesting the tree crop, but can be overcome by using special equipment and by logging during the drier seasons.

This soil has low potential for most urban uses. Flood hazard and wetness are the limitations. Capability unit IIw-2; woodland suitability group 1w8.

**CH—Chenneby-Arkabutla association, frequently flooded.** This association consists of somewhat poorly drained soils in large wooded areas on the flood plains along the Big Black River and some of its larger tributaries. Slopes are 0 to 2 percent. The composition of this mapping unit is more variable than most of the others in the county, but mapping was controlled well enough for the anticipated use of the soils. The Chenneby soils are in bands adjacent to former stream channels, and the Arkabutla soils occupy the broad flats. The soils are subject to frequent flooding of brief duration. The mapped areas are mostly long and medium wide and are 60 to 700 acres in size.

The somewhat poorly drained Chenneby soils make up about 50 percent of the association. Typically the surface layer is a dark brown silt loam about 7 inches thick. It is underlain by a dark brown silt loam about 7 inches thick. The next layer is a dark yellowish brown or dark brown silty clay loam that is about 24 inches thick and has grayish mottles in the lower part. The 38 to 60 inch layer is a silty clay loam mottled in shades of brown and gray.

The Chenneby soils are strongly acid or very strongly acid except for surface layers that have been limed. Permeability is moderate. The available water capacity is high.

The somewhat poorly drained Arkabutla soils make up about 40 percent of the association. Typically the surface layer is dark brown silt loam that has grayish mottles and is about 6 inches thick. It is underlain by dark brown silt loam that has grayish and brownish mottles and is about 4 inches thick. The next 8 inches is silty clay loam mottled in shades of gray and brown. Below this is a light brownish gray or gray silt loam or silty clay loam mottled in shades of brown to a depth of 60 inches.

The Arkabutla soils are strongly acid or very strongly acid. Permeability is moderate. The available water capacity is high.

Included in the mapping are a few areas of the well drained Cascilla soils, the moderately well drained Oaklimeter soils, and the poorly drained Guyton and Bonn soils.

Practically all of this mapping unit is in hardwood forest. There are some swampy undrained areas. This association has very high potential for timber. Use of equipment is restricted during wet seasons, and plant competition is moderate to severe.

Frequent flooding is the main limitation to use of these soils for farming and most other purposes. Soil wetness is so severe and difficult to overcome that the potential for urban uses is low. The potential for woodland wildlife is good and for wetland wildlife fair. Capability unit IVw-1; woodland suitability group 1w9.

**FaA—Falkner silt loam, 0 to 2 percent slopes.** This deep, somewhat poorly drained soil is on broad upland flats in the eastern part of the county.

Typically the surface layer is dark yellowish brown silt loam that has few yellowish brown mottles and is about 6 inches thick. It is underlain by yellowish brown silt loam that has grayish mottles and is about 5 inches thick. The next layer is silty clay loam mottled in shades of brown and gray to a depth of 33 inches. The 33 to 75 inch silty clay layers are gray mottled in shades of brown and red.

Small areas of Tippah and Longview soils are included in the mapping unit.

This soil is slightly acid to extremely acid. Permeability is moderately slow in the upper subsoil and slow in the lower subsoil. The available water capacity is high.

This soil has high potential for row crops, pasture, and hay. Seedbed preparation and cultivation are sometimes a problem because of the high water table. Crop residue should be shredded and left on the surface as a mulch to reduce crusting. Row arrangement and surface field ditches are needed.

This soil has high potential for cherrybark oak, loblolly pine, shortleaf pine, and sweetgum. Limitations for woodland use and management are slight to moderate.

This soil has medium potential for most urban uses. The shrink-swell potential and wetness are limitations, but can be overcome by special design and careful installation procedures. The clayey subsoil percolates slowly, which is a limitation for septic tank absorption fields. Capability unit IIw-3; woodland suitability group 2w8.

**FaB—Falkner silt loam, 2 to 5 percent slopes.** This deep, somewhat poorly drained soil is on uplands in the eastern part of county.

Typically the surface layer is dark yellowish brown silt loam that has few yellowish brown mottles and is about 6 inches thick. It is underlain by yellowish brown silt loam that has grayish mottles and is about 5 inches thick. The next layer is silty clay loam mottled in shades of brown and gray to a depth of 33 inches. The 33 to 75 inch silty clay layers are gray mottled in shades of brown and red.

Small areas of Tippah and Wilcox soils are included in the mapping unit.

This soil is slightly acid to extremely acid. Permeability is moderately slow in the lower subsoil. The available water capacity is high.

This soil has medium potential for row crops and a high potential for pasture and hay. Erosion hazard is severe. Because of the seasonal high water table, seedbed preparation may be delayed. The soil crusts and packs. Minimum tillage, return of crop residues, crop rotations, contour tillage, contour stripcropping, and grassed waterways are needed.

This soil has high potential for cherrybark oak, loblolly pine, shortleaf pine, and sweetgum. Limitations for woodland management are slight to moderate.

This soil has medium potential for most urban uses. The shrink-swell potential and wetness are limitations, but can be overcome by special design and careful installation procedures. The clayey subsoil percolates slowly, which is a limitation for septic tank absorption fields. Capability unit IIIe-1; woodland suitability group 2w8.

**Gu—Guyton silt loam.** This poorly drained soil is on flood plains and low terraces. Slopes are 0 to 2 percent.

Typically the surface layer is about 6 inches of grayish brown silt loam with dark brown mottles over about 15 inches of light brownish gray or gray silt loam with brownish mottles. The next layer is gray silty clay loam with brownish mottles to a depth of 38 inches. Below this to a depth of 82 inches is gray silt loam mottled in shades of brown.

Included in the mapping are small areas of Bonn, Bude, Oaklimeter, and Ozan soils.

The soil is medium acid to very strongly acid. Permeability is slow. Runoff is slow to very slow. Available water capacity is high. The seasonal high water table is at the surface. Seedbed preparation and tillage are usually delayed because of wetness. The surface layer crusts and packs.

This soil has medium potential for small grain, hay, and pasture. Cotton and corn are poorly suited. Returning crop residue to the soil helps maintain tilth. This soil is subject to flooding during periods of high rainfall. Moderate crop damage results if overflow occurs during the growing season. Surface field ditches and row arrangement are needed to remove excess surface water for crops and pasture.

This soil has high potential for loblolly pine and sweetgum. Wetness is the main limitation for woodland use and management.

This soil has low potential for most urban uses. Flood hazard and wetness are the main limitations. Capability unit IIIw-1; woodland suitability group 2w9.

**Je—Jena fine sandy loam.** This deep, well drained soil is on scattered flood plains throughout the county. Slopes are 0 to 2 percent.

Typically the surface layer is dark brown fine sandy loam about 8 inches thick. This is underlain by yellowish brown fine sandy loam that extends to a depth of 60 inches or more and has brownish mottles in the lower part.

Small areas of Cascilla and Oaklimeter soils are included in the mapping unit.

This soil is medium acid to very strongly acid. Permeability is moderate, and runoff is medium. The available water capacity is medium.

This soil has high potential for row crops, pasture, and hay. Seedbed preparation and tillage are no problem. The root zone is deep and easily penetrated by plant roots. Crop residue should be shredded and left on the surface as a mulch. Overflow is a hazard for short periods in late winter or early spring. In most fields, surface drains and rows should be arranged to remove excess surface water.

This soil has very high potential for loblolly pine, American sycamore, and eastern cottonwood. There are no significant limitations for woodland use or management.

This soil has low potential for most urban uses. Flood hazard and low strength are the limitations. Capability unit IIw-4; woodland suitability group 1o7.

**LoA—Longview silt loam, 0 to 2 percent slopes.** This is a deep, somewhat poorly drained soil on broad upland flats.

Typically the surface layer is dark yellowish brown silt loam about 7 inches thick. The upper subsoil is yellowish brown or light yellowish brown silt loam with brownish mottles to a depth of 20 inches. This is underlain by silt loam mottled in shades of brown and gray to a depth of 31 inches. Below this layer to a depth of 60 inches is gray silty clay loam mottled in shades of brown.

Small areas of Guyton and Providence soils are included.

This soil is strongly acid to extremely acid except where the surface layer has been limed. Permeability is moderately slow. Runoff is slow. The available water capacity is high. As a result of wetness and the seasonal high water table, seedbed preparation and tillage are sometimes a problem.

This soil has high potential for row crops, pasture, and hay. Minimum tillage, return of crop residues, row arrangement, and surface field ditches are needed.

This soil has high potential for cherrybark oak, shumard oak, loblolly pine, sweetgum, and yellow poplar. Wetness is the main limitation for woodland management.

This soil has medium potential for urban uses. Wetness is the main limitation, but can be overcome by drainage measures, good design, and careful installation procedures. The lower subsoil percs slowly, but this limitation can be overcome by increasing the size of the absorption area or by modifying the filter field. Capability unit IIw-5; woodland suitability group 2w8.

**MaE—Maben loam, 8 to 15 percent slopes.** This is a moderately deep, well drained soil that is on uplands.

Typically the surface layer is dark brown loam about 4 inches thick. It is underlain to a depth of 17 inches with yellowish red clay. The 17- to 24-inch layer is yellowish red silty clay with red mottles and gray shale fragments. It is underlain by mottled red, grayish brown clay loam that contains shale fragments and is about 16 inches thick. The 40 to 60 inch layer is stratified, partially weathered grayish brown shale and yellowish brown fine sandy loam.

Included are small areas of Wilcox and Tippah soils. Also included are a few small areas that have a silt loam or sandy loam surface layer.

The soil is medium acid to very strongly acid. Permeability is moderately slow. The available water capacity is high. Runoff is rapid, and the erosion hazard is severe unless a vegetative cover is maintained.

The soil has low potential for row crops, hay, and pasture. Its potential is limited because of the slope and the clayey texture of the subsoil. Forage production is moderate to low.

This soil has moderately high potential for loblolly and shortleaf pine. The clayey subsoil is the main limitation for woodland use and management.

This soil has low potential for most urban uses. The shrink-swell potential and the slope are limitations, but can be overcome by special design and careful installation. The clayey subsoil percolates slowly, which is a limitation for septic tank absorption fields. Capability unit VIe-3; woodland suitability group 3c2.

**MWE—Maben-Wilcox-Tippah association, hilly.** This association consists of well drained, somewhat poorly drained, and moderately well drained soils that occur on uplands. Slopes range from 12 to 35 percent. The landscape is hilly with narrow winding ridgetops and steep side slopes and narrow drainageways. The Maben soils generally are at mid slope and on the lower parts of the moderately steep and steep side slopes. The Wilcox soils are at mid slope and on the upper parts of the moderately steep and steep side slopes. The Tippah soils are mainly on narrow ridgetops and, in some places, they are on the upper part of the less sloping sides. The Maben soils developed from clayey materials over stratified shaly, clayey, and sandy material. The Wilcox soils developed from clayey materials over shale. The Tippah soils developed from silty over clayey materials. Individual areas are 160 to 1,000 acres in size. The composition of this unit is more variable than most of the others in the county, but mapping was controlled well enough for the expected use of these soils.

The well drained Maben soils make up about 52 percent of the association. Typically the surface layer is a dark brown loam about 4 inches thick. It is underlain to a depth of 17 inches with yellowish red clay. The 17 to 24 inch layer is yellowish red silty clay with red mottles and gray shale fragments. It is underlain by mottled red, grayish brown clay loam that contains shale fragments and is about 16 inches thick. The 40 to 60 inch layer is stratified, partially weathered grayish brown shale and yellowish brown fine sandy loam.

Maben soils are medium acid to very strongly acid. Permeability is moderately slow. The available water capacity is high. Runoff is rapid.

The somewhat poorly drained Wilcox soils make up 35 percent of the association. Typically the surface layer is dark brown silty clay loam 4 inches thick. It is underlain by reddish brown silty clay loam that has grayish and brownish mottles and is about 4 inches thick. The next layer is silty clay mottled in shades of red, gray, and brown to a depth of 44 inches. The next layer is gray clay with brownish mottles to a depth of 50 inches. The 50 to 72 inch layer is stratified gray, pale olive, and light olive brown soft shale.

Wilcox soils are strongly acid to extremely acid. Permeability is very slow. The available water capacity is high, and runoff is medium to rapid.

The moderately well drained Tippah soils make up 13 percent of the association. Typically the surface layer is yellowish brown silt loam about 5 inches thick. It is underlain by yellowish red and strong brown silty clay loam that is about 17 inches thick and has brownish and grayish mottles in the lower part. The next layer is mottled in shades of red, brown, and gray to a depth of 46 inches. Below this is light brownish gray silty clay mottled in shades of brown and red.

Tippah soils are medium acid to very strongly acid. Permeability is slow. Available water capacity is high.

Included in the mapping unit are small areas of the moderately well drained Ora and Providence soils and the somewhat poorly drained Falkner and Arkabutla soils in the narrow drainageways.

This mapping unit has low potential for row crops, pasture, and hay. Its potential is limited because of the slope and the clayey subsoil. Forage production is low.

This mapping unit has moderately high potential for timber (fig. 2). The clayey subsoil is the main limitation for woodland use and management.

This mapping unit has low potential for most urban uses. The shrink-swell potential and the slope are limitations, but can be overcome by special design and careful installation. The clayey subsoil percolates slowly, which is a limitation for septic tank absorption fields. Capability unit VIIe-1; Maben soil in woodland suitability group 3c2, Wilcox soil in 3c3, Tippah soil in 3o7.

**Oa—Oaklimeter silt loam.** This deep, moderately well drained soil is on the scattered flood plains of streams throughout the county. Slopes are 0 to 2 percent.

Typically the surface layer is brown silt loam that has brownish mottles and is about 7 inches thick. It is underlain by dark yellowish brown silt loam that has brownish mottles and is about 9 inches thick. The next layer is silt loam mottled in shades of brown and gray to a depth of 72 inches.

Small areas of Ariel, Arkabutla, Chenneby, and Guyton soils are included. Included soils make up about 10 to 20 percent of this mapping unit. Also included are some areas on the Big Black flood plains and lower tributaries that are flooded frequently.

This soil is strongly acid to very strongly acid except where the surface layer has been limed. Permeability is moderate. The available water capacity is high. Runoff is slow.

This soil has high potential for row crops, pasture, and hay. The root zone is deep and is easily penetrated by plant roots. Seedbed preparation and tillage are a slight problem as a result of crusting and packing of the silty soil. Crop residue should be shredded and left on the surface as a mulch. Overflow is a hazard for short periods in late winter or early spring. Slight or moderate crop damage may result if overflows occur during the crop growing season. In most fields, surface drains and rows should be arranged to remove excess surface water. Some areas need diversions to control water from adjacent hills.

This soil has very high potential for cherrybark oak, eastern cottonwood, loblolly pine, nuttall oak, sweetgum, water oak, and yellow poplar. There are no significant limitations for woodland use or management.

This soil has low potential for most urban uses. Flood hazard and wetness are the main limitations. Capability unit IIw-1; woodland suitability group 1o7.

**OrC2—Ora loam, 5 to 8 percent slopes, eroded.** This deep, moderately well drained soil is on upland ridgetops.

Typically the surface layer is yellowish brown loam about 4 inches thick. It is underlain by yellowish red loam or clay loam about 12 inches thick. The next layer is yellowish red loam that has red coatings and pale brown mottles and is about 5 inches thick. There is a compact and brittle fragipan at 21 to 48 inches. The 21 to 40 inch layer is yellowish red fine sandy loam mottled with red, pale brown, and gray. The lower 8 inches of the fragipan is yellowish red loam with yellowish brown, pale brown, and gray mottles. The underlying layer to a depth of 60 inches is a red sandy clay loam with yellowish brown mottles.

In most fields the surface layer has been thinned by erosion. Rills and gall spots are common, and there is a mixing of the subsoil and the plow layer. Included in mapping are a few areas that are severely eroded and some that are slightly eroded. A few small areas of Providence and Tippah soils are also included.

This soil is strongly acid or very strongly acid. Permeability is moderate in the upper part of the solum and moderately slow in the fragipan. Available water capacity is medium. Runoff is medium. The soil has fair tilth and can be worked throughout a fairly wide range of moisture conditions. The root zone is moderately deep and is easily penetrated by plant roots.

Most of the acreage is used for row crops and pasture. Cotton, corn, soybeans, small grain, and pasture plants are well suited. Soil erosion is a hazard on cropland, but can be controlled by use of grassed waterways, stripcropping, crop rotations, and parallel terracing. Returning crop residue helps maintain tilth.

This soil has moderately high potential for loblolly pine, shortleaf pine, and sweetgum. There are no significant limitations for woodland use or management.

This soil has high potential for most urban uses. Low strength is the major limitation, but can be easily overcome by good design and careful installation procedures. The lower subsoil percs slowly, which is a limitation for septic tank absorption fields but can be partially overcome by increasing the size of the absorption area or by modifying the filter field. Capability unit IIIe-2; woodland suitability group 3o7.

**OrD2—Ora loam, 8 to 12 percent slopes, eroded.** This deep, moderately well drained soil is on uplands.

Typically the surface layer is yellowish brown loam about 4 inches thick. It is underlain by yellowish red loam or clay loam about 12 inches thick. The next layer is yellowish red loam that has red coatings and pale brown mottles and is about 5 inches thick. There is a compact and brittle fragipan at 21 to 48 inches. The 21- to 40-inch layer is yellowish red fine sandy loam with red, pale brown, and gray mottles. The lower 8 inches of the fragipan is yellowish red loam with yellowish brown, pale brown, and gray mottles. The underlying layer to a depth of 60 inches is a red sandy clay loam with yellowish brown mottles.

In most fields the surface layer has been thinned by erosion and small rills and shallow gullies are common. Small areas of Providence and Tippah soils and areas that are severely eroded are included.

This soil is strongly acid or very strongly acid. Permeability is moderate in the upper subsoil and moderately slow in the fragipan. Available water capacity is medium. Runoff is high. The soil has fair tilth and can be worked throughout a fairly wide range of moisture conditions. The root zone is moderately deep and is easily penetrated by plant roots to the fragipan.

This soil has only medium potential for row crops because of strong slope. It has high potential for hay and pasture. Erosion is a hazard if cultivated crops are grown. Minimum tillage, stripcropping, crop rotation, parallel terracing, and grassed waterways are practices that help reduce runoff and control erosion. Returning crop residue to the soil helps maintain tilth.

This soil has moderately high potential for loblolly pine, shortleaf pine, and sweetgum. There are no significant limitations for woodland use or management.

This soil has medium potential for most urban uses. Low strength and slope are the main limitations. These may be overcome by good design and careful installation procedures. The slow percolation and strong slopes are limitations for septic tank absorption fields that are difficult to overcome. Capability unit IVe-1; woodland suitability group 3o7.

**OrD3—Ora loam, 8 to 12 percent slopes, severely eroded.** This deep, moderately well drained soil is on uplands.

Typically the surface layer is yellowish brown loam about 4 inches thick. It is underlain by yellowish red loam or clay loam about 12 inches thick. The next layer is yellowish red loam that has red coatings and pale brown mottles and is about 5 inches thick. There is a compact and brittle fragipan at 21 to 48 inches. The 21 to 40 inch layer is yellowish red fine sandy loam with red, pale brown, and gray mottles. The lower 8 inches of the fragipan is yellowish red loam with yellowish brown, pale brown, and gray mottles. The underlying layer to a depth of 60 inches is a red sandy clay loam with yellowish brown mottles.

Erosion has removed most of the original surface layer of this soil, and rills and small gullies have formed. Some deep gullies occur in most areas. Small areas of Providence and Tippah soils and areas that are eroded are included.

The soil is strongly acid or very strongly acid. Permeability is moderate in the upper part of subsoil and moderately slow in the fragipan. Available water capacity

is medium, and runoff is high. The soil has poor tilth and can be worked throughout only a narrow range of moisture conditions. The root zone is moderately deep and is easily penetrated by plant roots to the fragipan.

This soil has low potential for row crops because of strong slopes and severe erosion. It has medium potential for hay and pasture. Management concerns include proper stocking, controlled grazing, and weed and brush control.

This soil has moderately high potential for loblolly pine, shortleaf pine, and sweetgum. There are no significant limitations for woodland use or management.

This soil has medium potential for most urban uses. Low strength and slope are the main limitations. These may be overcome by good design and careful installation procedures. The slow percolation and strong slopes are limitations for septic tank absorption fields that are difficult to overcome. Capability unit VIe-1; woodland suitability group 3o7.

**Oz—Ozan silt loam.** This is a poorly drained soil that is on stream terraces. Slopes are 0 to 2 percent.

Typically the surface layer is grayish brown silt loam that has brownish mottles and is about 6 inches thick. This layer is underlain by light brownish gray sandy loam with brownish mottles to a depth of 60 inches. The 60- to 67-inch layer is a light gray sandy clay loam with brownish mottles. It is underlain by a sandy clay loam mottled in shades of brown to about 80 inches.

Small areas of Bude, Oaklimeter, Guyton, and Stough soils are included.

The soil is medium acid to very strongly acid. Permeability is slow. Runoff is slow. Available water capacity is high. The soil has a seasonal high water table. Seedbed preparation and tillage are usually delayed as a result of wetness.

This soil has a medium potential for grain sorghum, soybeans, grasses, and legumes. Returning crop residue to the soil helps maintain tilth. Surface field ditches and row arrangement are recommended.

This soil has high potential for loblolly pine, Shumard oak, sweetgum, American sycamore, and eastern cottonwood. Wetness is the main limitation for woodland use and management.

This soil has low potential for most urban uses. Wetness and slow percolation are the limitations. Capability unit IIIw-2; woodland suitability group 2w9.

**PnB—Prentiss silt loam, 2 to 5 percent slopes.** This is a deep moderately well drained soil that has a fragipan. It is on ridgetops.

Typically the surface layer is very dark grayish brown silt loam about 1 inch thick underlain by dark brown silt loam about 5 inches thick. Below this to about 29 inches is yellowish brown silt loam with brownish mottles in the lower part. The underlying fragipan is 31 inches thick. It is silt loam mottled in shades of brown, yellow, and gray to about 60 inches.

Included are small areas of Providence and Stough soils.

The soil is strongly acid to very strongly acid. Permeability is moderate in the upper part of the solum and moderately slow in the fragipan. Runoff is medium. Available water capacity is medium. The soil has good tilth and can be worked throughout a moderate range of moisture content without clodding.

This soil has high potential for row crops, hay, and pasture. High yields can be obtained when it is well managed. Crop residue should be shredded and left on the surface as a mulch to reduce crusting and packing. In cultivated fields erosion is a slight to moderate hazard. When this soil is used for row crops, the rows should be arranged to reduce erosion and conserve moisture. Waterways and outlets should be sodded with grass.

This soil has moderately high potential for loblolly pine. Limitations are only slight for woodland use and management.

This soil has high potential for most urban uses. Wetness and low strength are limitations, but can be overcome by good design and careful installation procedures. The lower subsoil percs slowly, which is a limitation for septic tank absorption fields but can be partially overcome by increasing the size of the absorption area or by modifying the filter field. Capability unit IIe-1; woodland suitability group 2o7.

**PoA—Providence silt loam, 0 to 2 percent slopes.** This is a deep, moderately well drained soil that has a fragipan. It is on broad flats.

Typically the surface layer is light yellowish brown silt loam about 5 inches thick. The upper 3 inches of the subsoil is yellowish brown silt loam. The 8- to 22-inch layer is strong brown silt loam with pale brown mottles in the lower part. The underlying fragipan is 38 inches thick. The upper 6 inches is yellowish brown silt loam with brownish mottles. The next 32 inches is loam mottled in shades of gray and brown or is yellowish brown with grayish and brownish mottles.

Included in mapping are small areas of Bude, Guyton, and Stough soils.

The soil is medium acid to very strongly acid. Permeability is moderate in the upper subsoil and moderately slow in the fragipan. The available water capacity is medium. The soil has fair tilth and can be worked throughout a fairly wide range of moisture conditions. The root zone is moderately deep and is easily penetrated by plant roots to the fragipan.

This soil has good potential for row crops and small grain. High yields can be obtained under good management. The soil has high potential for hay and pasture. Returning crop residue to the soil helps maintain good tilth. Row arrangement is needed to remove surface water.

This soil has moderately high potential for loblolly pine, shortleaf pine, and sweetgum. There are no significant limitations for woodland use or management.

This soil has high potential for most urban uses. Low strength is the main limitation, but can be easily overcome by good design and careful installation procedures.

The lower subsoil percs slowly, which is a limitation for septic tank absorption fields but can be partially overcome by increasing the size of the absorption area or by modifying the filter field. Capability unit IIw-6; woodland suitability group 3o7.

**PoB2—Providence silt loam, 2 to 5 percent slopes, eroded.** This is a deep, moderately well drained soil that has a fragipan. It is on ridgetops.

Typically the surface layer is light yellowish brown silt loam about 5 inches thick. The upper 3 inches of the subsoil is yellowish brown silt loam. The 8 to 22 inch layer is strong brown silt loam with pale brown mottles in the lower part. The underlying fragipan is 38 inches thick. The upper 6 inches is yellowish brown silt loam with brownish mottles. The next 32 inches is loam mottled in shades of gray and brown or is yellowish brown with grayish and brownish mottles.

Included with this soil in mapping are small areas of Bude, Ora, and Tippah soils.

This soil is medium acid to very strongly acid. Permeability is moderate in the upper subsoil and moderately slow in the fragipan. Available water capacity is medium. Runoff is slow to medium. The soil has good tilth and can be worked throughout a moderate range of moisture content without clodding.

This soil has good potential for row crops, hay, and pasture. High yields can be obtained if it is well managed. Crop residue should be shredded and left on the surface as a mulch to reduce crusting and packing. In cultivated fields erosion is a moderate hazard. When this soil is used for row crops, the rows should be arranged to reduce erosion and conserve moisture. Waterways and outlets should be sodded with grass.

This soil has a moderately high potential for loblolly pine, shortleaf pine, and sweetgum. Limitations are only slight for woodland use and management.

The soil has a high potential for most urban uses. The low strength limitation can be easily overcome by good design and careful installation procedures. The subsoil percs slowly, which is a limitation for septic tank absorption fields but can be partially overcome by increasing the size of the absorption area or by modifying the filter field. Capability unit IIe-2; woodland suitability group 3o7.

**PoC2—Providence silt loam, 5 to 8 percent slopes, eroded.** This is a deep, moderately well drained soil that has a fragipan. It is on ridgetops and upper side slopes.

Typically the surface layer is light yellowish brown silt loam about 5 inches thick. The upper 3 inches of the subsoil is yellowish brown silt loam. The 8 to 22 inch layer is strong brown silt loam with pale brown mottles in the lower part. The underlying fragipan is 38 inches thick. The upper 6 inches is yellowish brown silt loam with brownish mottles. The next 32 inches is loam mottled in shades of gray and brown or is yellowish brown with grayish and brownish mottles.

In most fields the surface layer has been thinned by erosion. Rills and small gall spots are common, and there is a mixing of the subsoil and the plow layer. Included in mapping are a few areas that are severely eroded. Ora and Tippah soils are also included.

This soil is medium acid to very strongly acid. Permeability is moderate in the upper subsoil and moderately slow in the fragipan. Available water capacity is medium. Runoff is medium. The soil has fair tilth and can be worked throughout a fairly wide range of moisture conditons. The root zone is moderately deep and is easily penetrated by plant roots.

This soil has only medium potential for row crops and small grain, but high yields can be obtained. Its potential is limited because of the slope and the depth to the fragipan. It has high potential for hay and pasture. Returning crop residue to the soil helps maintain good tilth. Erosion is a moderate hazard if cultivated crops are grown. Minimum tillage, stripcropping, crop rotation, and parallel terracing with grassed waterways are practices that help reduce runoff and control erosion.

This soil has moderately high potential for loblolly pine, shortleaf pine, and sweetgum. There are no significant limitations for woodland use or management.

This soil has medium potential for most urban uses. The low strength and the slope are limitations, but they can be easily overcome by good design and careful installation procedures. The lower subsoil percs slowly, which is a limitation for septic tank absorption fields but can be partially overcome by increasing the size of the absorption area or by modifying the filter field. Capability unit IIIe-3; woodland suitability group 3o7.

**PoD3—Providence silt loam, 5 to 12 percent slopes, severely eroded.** This is a deep, moderately well drained soil that has a fragipan. It is on ridgetops and upper side slopes.

Typically the surface layer is light yellowish brown silt loam about 5 inches thick. The upper 3 inches of the subsoil is yellowish brown silt loam. The 8 to 22 inch layer is strong brown silt loam with pale brown mottles in the lower part. The underlying fragipan is 38 inches thick. The upper 6 inches is yellowish brown silt loam with brownish mottles. The next 32 inches is loam mottled in shades of gray and brown or is yellowish brown with grayish and brownish mottles.

In most fields the surface layer has been removed by erosion, and rills and shallow gullies have formed. Some deep gullies occur in places. Included in mapping are a few areas that are moderately eroded. A few small areas of Ora and Tippah soils are also included.

The soil is medium acid to very strongly acid. Permeability is moderate in the upper subsoil and moderately slow in the fragipan. Available water capacity is medium. Runoff is medium to rapid. The soil has poor tilth and can be worked throughout only a narrow range of moisture conditions. The root zone is moderately deep and is easily penetrated by plant roots to the fragipan.

This soil has low potential for row crops and small grain. Its potential is limited because of slope, severe erosion, and the depth to the fragipan. It has medium poten-

tial for hay and pasture. Returning crop residue to the soil helps maintain tilth. Erosion is a severe hazard if cultivated crops are grown. Minimum tillage, stripcropping, crop rotation, and parallel terracing with grassed waterways are practices that help reduce runoff and control erosion.

This soil has moderately high potential for loblolly pine, shortleaf pine, and sweetgum. There are no significant limitations for woodland use or management.

This soil has medium potential for most urban uses. The low strength and the slope are limitations, but can be overcome by good design and careful installation procedures. The lower subsoil percs slowly, which is a limitation for septic tank absorption fields but can be partially overcome by increasing the size of the absorption area or by modifying the filter field. Capability unit VIe-2; woodland suitability group 3o7.

**PoD2—Providence silt loam, 8 to 12 percent slopes, eroded.** This is a deep, moderately well drained soil that has a fragipan. It is on upper side slopes.

Typically the surface layer is light yellowish brown silt loam about 5 inches thick. The upper 3 inches of the subsoil is yellowish brown silt loam. The 8 to 22 inch layer is strong brown silt loam with pale brown mottles in the lower part. The underlying fragipan is 38 inches thick. The upper 6 inches is yellowish brown silt loam with brownish mottles. The next 32 inches is loam mottled in shades of gray and brown or is yellowish brown with grayish and brownish mottles.

The surface layer has been thinned in most areas by erosion and small rills, and shallow gullies are common. Included in mapping are a few severely eroded areas. A few areas of Tippah and Ora soils are also included.

This soil is medium acid to very strongly acid. Permeability is moderate in the upper subsoil and moderately slow in the fragipan. Available water capacity is medium. Runoff is medium to rapid. The soil has fair tilth and can be worked throughout a fairly wide range of moisture conditions. The root zone is moderately deep and is easily penetrated by plant roots.

This soil has low potential for row crops and small grain. Its potential is limited because of the slope and the depth to the fragipan. It has medium potential for hay and pasture. Returning crop residue to the soil helps maintain good tilth. Erosion is a severe hazard if cultivated crops are grown. Minimum tillage, stripcropping, crop rotation, parallel terracing, and grassed waterways are practices that help reduce runoff and control erosion.

This soil has moderately high potential for loblolly pine, shortleaf pine, and sweetgum and has no significant limitations for woodland use or management.

This soil has low potential for most urban uses. The low strength and the slope are the limitations, but can be overcome by good design and careful installation procedures. The lower subsoil percs slowly, which is a limitation for septic tank absorption fields but can be partially overcome by increasing the size of the absorption area or by modifying the filter field. Capability unit IVe-2; woodland suitability group 3o7.

**PrE—Providence complex, gullied.** This mapping unit is eroded to the extent that in many places the profile of the original soil cannot be identified. The slopes range from 5 to 35 percent, but typically are 10 to 20 percent. Areas range from 5 to 30 acres in size. Most contain an intricate pattern of deep gullies that make up about 65 percent of the landscape. Erosion has been so severe that only narrow fingerlike extensions and isolated remnants of the Providence soils remain. It was not practical to show the network of gullies and the remnants of Providence soils separately at the mapping scale. A few areas of Ora, Smithdale, and Tippah soils are included in the mapping unit.

The moderately well drained Providence soils are on the narrow fingerlike ridges. Slopes are 5 to 10 percent. Typically the surface layer is yellowish brown silt loam about 3 inches thick. It is underlain by a strong brown silt loam about 11 inches thick. The 6 to 22 inch layer is yellowish red silty clay loam. Below this to a depth of about 60 inches is a fragipan that is firm, compact, and brittle. It is mottled yellowish red, yellowish brown, and light brownish gray silty clay loam in the upper 10 inches and mottled yellowish red, yellowish brown, light gray, and light olive brown sandy clay loam in the lower 28 inches.

These soils are medium acid to very strongly acid. Permeability is moderate in the upper part of the subsoil and moderately slow in the fragipan. The available water capacity is medium. Surface runoff is medium to rapid.

The gullied areas slope from about 5 to 35 percent and are extremely variable from one place to another. In most areas the gullies are U and V shaped and have branched and grown laterally, forming a network of numerous gullies especially on the lower part of the slope. They range from about one half acre to several acres in size. Most are 2 to 10 feet deep, but some are deeper. In other areas gullies are wide and shallow and have 5 to 10 percent slopes. The texture of the material ranges from silts to sands. The material in the gullies is acid. The rate of runoff is very rapid. The available water capacity is variable.

This complex has a very low potential for farming and urban uses.

This complex has low potential for woodland. Most of it is in loblolly pine trees. Areas of Providence soil between gullies produce fair trees. The gullies restrict the use of logging equipment.

This complex has medium potential for wildlife habitat and for recreational uses. Capability unit VIIe-2; woodland suitability group 3o7.

**SmE—Smithdale sandy loam, 15 to 25 percent slopes.** This deep, well drained soil is on uplands.

Typically the surface layer is sandy loam about 7 inches thick. It is dark grayish brown in the upper 1 inch and brown in the lower 6 inches. Below the surface layer, to a depth of about 30 inches, is red sandy clay loam. The next layer to a depth of about 83 inches is red sandy loam.

Small areas of Ora, Providence, and Sweatman soils are included.

The soil is strongly acid to very strongly acid. Permeability is moderate. The available water capacity is high.

This soil has a low potential for row crops, pasture, and hay. Its potential is limited because of slope. The erosion hazard is severe unless a vegetative cover is maintained. Forage production is low to medium.

This soil has moderately high potential for loblolly pine. There are no significant limitations for woodland use or management.

This soil has low potential for most urban uses. Slope is the main limitation, but can be overcome by good design and careful installation procedures. Slope is also a limitation for septic tank absorption fields that is difficult to overcome. Capability unit VIIe-3; woodland suitability group 3o1.

**SOE—Smithdale-Ora association, hilly.** This association consists of well drained and moderately well drained soils that occur on uplands. Slopes are 12 to 35 percent. The landscape is hilly with narrow winding ridgetops, moderately steep and steep side slopes, and narrow drainageways. The Smithdale soils are on the upper and middle parts of the moderately steep and steep slopes. The Ora soils are mainly on the narrow ridgetops and in some places on the upper parts of less sloping sides. These soils formed in loamy Coastal Plain material. Individual areas are 200 to 1,000 acres in size. The composition of this unit is more variable than that of most of the others in the county, but mapping was controlled well enough for the expected use of these soils.

The well drained Smithdale soils make up about 44 percent of the association. Typically the surface layer is dark grayish brown sandy loam about 1 inch thick over a brown sandy loam about 6 inches thick. The upper subsoil is a red sandy clay loam about 23 inches thick. The lower subsoil to a depth of 83 inches is a red sandy loam.

The Smithdale soils are strongly acid or very strongly acid. Permeability is moderate. The available water capacity is high. Surface runoff is rapid.

The moderately well drained Ora soils make up 26 percent of the association. Typically the surface layer is yellowish brown loam about 4 inches thick. It is underlain by yellowish red loam or clay loam about 12 inches thick. The next 5 inches is yellowish red loam with red coatings and pale brown mottles. There is a compact and brittle fragipan at 21 to 48 inches. The 21 to 40 inch layer is yellowish red fine sandy loam with red, pale brown, and gray mottles. The lower 8 inches of the fragipan is yellowish red loam with yellowish brown, pale brown, and gray mottles. Below this to a depth of 60 inches is red sandy clay loam with yellowish brown mottles.

The Ora soils are strongly acid or very strongly acid. Permeability is moderate in the upper part of the solum and moderately slow in the fragipan. The available water capacity is medium. Runoff is medium to rapid.

Included areas of the moderately well drained Providence soils and the well drained Sweatman soils and Oaklimeter soils in the narrow drainageways make up about 30 percent of this mapping unit.

This mapping unit has low potential for row crops, pasture, and hay. Its potential is limited because of slope and erosion hazard. Forage production is low to medium.

This mapping unit has moderately high potential for timber (fig. 3). There are no significant limitations for woodland use or management.

This mapping unit has low potential for most urban uses. Low strength and slope are the main limitations, but can be overcome by good design and careful installation procedures. Slope is also a limitation for septic tank absorption fields that is difficult to overcome. Capability unit VIIe-3, Smithdale soil in woodland suitability group 3o1, Ora soil in 3o7.

**StA—Stough fine sandy loam, 0 to 2 percent slopes.** This is a deep, somewhat poorly drained soil that is on stream terraces and broad uplands.

Typically the surface layer is about 6 inches of grayish brown fine sandy loam with dark yellowish brown mottles underlain by about 3 inches of mottled grayish brown and yellowish brown loam. The next layer is loam mottled in shades of gray and brown to a depth of 37 inches. Below this is a fine sandy loam mottled in shades of gray and brown to a depth of 65 inches.

Small areas of Ozan and Prentiss soils are included in mapping.

This soil is strongly acid to very strongly acid. Permeability is moderately slow. The available water capacity is medium. Runoff is slow. The soil has fair tilth and can be worked throughout a fairly wide range of moisture conditions. The root zone is deep and is easily penetrated by plant roots.

This soil has high potential for row crops and small grain. Its potential is limited because of a seasonal high water table. It has high potential for hay and pasture. Return of crop residue to the soil helps maintain good tilth. Surface field ditches and row arrangement are needed to remove excess surface water.

This soil has high potential for cherrybark oak, loblolly pine, sweetgum, and water oak. Wetness is a limitation for woodland use and management.

This soil has low potential for most urban uses. Wetness is the main limitation. Capability unit IIw-7; woodland suitability group 2w8.

**SuE—Sweatman loam, 15 to 25 percent slopes.** This is a moderately deep well drained soil that is on uplands.

Typically the surface layer is very dark grayish brown loam about 6 inches thick. It is underlain by red silty clay or silty clay loam that is about 17 inches thick and has brownish mottles in the lower part. The next layer is mottled red and brown sandy clay loam and contains light olive brown shale fragments. Below this to a depth of about 60 inches is a sandy loam mottled in shades of red and stratified with light yellowish brown and grayish brown, weathered shale.

Small areas of Tippah, Providence, Wilcox, and Ora soils are included in mapping.

This soil is strongly acid to very strongly acid. The available water capacity is high. Permeability is moderately slow. Runoff is rapid.

This soil has low potential for farming and most urban uses. The limitations are slope and shrink-swell potential.

This soil has moderately high potential for loblolly pine and shortleaf pine. The slope and the clayey subsoil are limitations for woodland use or management.

This soil has medium potential for wildlife habitat and recreational uses. Capability unit VIIc-4; woodland suitability group 3c2.

**SvD—Sweatman-Providence complex, 8 to 12 percent slopes.** This complex consists of small areas of the Sweatman and Providence soils that are so intermingled that they could not be separated at the scale selected for mapping. This unit occurs mostly on side slopes. The mapped areas range from 10 to 200 acres in size.

The well drained Sweatman soils make up 55 percent of each mapped area. Typically the surface layer is very dark grayish brown loam about 6 inches thick. It is underlain by red silty clay or silty clay loam that is about 17 inches thick and has brownish mottles in the lower part. The next layer is mottled red and brown sandy clay loam and contains light olive brown shale fragments. Below this to a depth of about 60 inches is a sandy loam mottled in shades of red and stratified with light yellowish brown and grayish brown weathered shale.

The soils are strongly acid to very strongly acid. Permeability is moderately slow. The available water capacity is high. Runoff is medium to rapid.

The moderately well drained Providence soils and closely similar soils make up 39 percent of each mapped area. Typically the surface layer is light yellowish brown silt loam about 5 inches thick. The 5- to 8-inch layer is yellowish brown silt loam. The 8- to 22-inch layer is strong brown silt loam with pale brown mottles in the lower part. The underlying fragipan is yellowish brown to strong brown silt loam from 22 to 28 inches and grades into loam at 28 inches and clay loam at 39 through 60 inches. The fragipan is mottled in shades of gray and brown.

Providence soils are medium acid to very strongly acid. Permeability is moderate in the upper subsoil and moderately slow in the fragipan. Available water capacity is medium.

Included areas of the moderately well drained Tippah and Ora soils make up about 16 percent of this complex.

This complex has low potential for row crops because of slope and erosion hazard. It has medium potential for hay and pasture. Management concerns include proper stocking, controlled grazing, and weed and brush control.

This complex has moderately high potential for loblolly and shortleaf pines. Limitations for woodland use and management are slight to moderate.

This complex has medium potential for most urban uses. The soils have moderate shrink-swell potential and require good design and careful installation procedures. The clayey subsoil in the Sweatman soils and the fragipan in the Providence soils perc slowly, which is a limitation for septic tank absorption fields but can be overcome by increasing the size of the absorption area or by modifying the filter field. Capability unit VIe-3; Sweatman soil in woodland suitability group 3c2, Providence soil in 3o7.

**SWE—Sweatman-Providence association, hilly.** This association consists of well drained and moderately well drained soils that occur on uplands. Slopes are 12 to 35 percent. The landscape is hilly with narrow winding ridgetops, moderately steep and steep side slopes, and narrow drainageways. The Sweatman soils are on the steep side slopes. The Providence soils are mainly on the narrow ridgetops and in some places on the upper parts of less sloping sides. The Sweatman soils formed in stratified clayey and loamy materials over shale, and the Providence soils formed in a thin mantle of silty material over loamy material. Individual areas are 160 to 1,000 acres in size. The composition of this mapping unit is more variable than that of most of the others in the county, but mapping was controlled well enough for the expected use of these soils.

The well drained Sweatman soils make up about 61 percent of the association. Typically the surface layer is very dark grayish brown loam about 6 inches thick. It is underlain by red silty clay or silty clay loam that is about 17 inches thick and has brownish mottles in the lower part. The next layer is mottled red and brown sandy clay loam that contains light olive brown shale fragments. Below this to a depth of about 60 inches is a sandy loam mottled in shades of red and stratified with light yellowish brown and grayish brown weathered shale.

The Sweatman soils are strongly acid to very strongly acid. Permeability is moderately slow. The available water capacity is high. Runoff is medium to rapid.

The moderately well drained Providence soils and closely similar soils make up 25 percent of the association. Typically the surface layer is light yellowish brown silt loam about 5 inches thick. The 5 to 8 inch layer is yellowish brown silt loam. The 8 to 22 inch layer is strong brown silt loam with pale brown mottles in the lower part. The underlying fragipan is yellowish brown to strong brown silt loam from 22 to 28 inches and grades into a loam at 28 inches and clay loam at 39 through 60 inches. The fragipan is mottled in shades of gray and brown.

Providence soils are medium acid to very strongly acid. Permeability is moderate in the upper subsoil and moderately slow in the fragipan. Available water capacity is medium.

Included areas of the moderately well drained Tippah and Ora soils and the loamy alluvial soils in the narrow drainageways make up about 14 percent of this mapping unit.

This mapping unit has low potential for row crops, pasture, and hay. Its potential is limited because of slope and erosion hazard. Forage production is low to medium.

This mapping unit has moderately high potential for timber. Limitations for woodland use and management are slight to moderate.

This mapping unit has low potential for most urban uses. Low strength, slope, and shrink-swell are the main

limitations, but can be overcome by good design and careful installation procedures (fig. 4). Slope is also a limitation for septic tank absorption fields that is difficult to overcome. Capability unit VIIe-4; Sweatman soil in woodland suitability group 3c2, Providence in 3o7.

**TaB2—Tippah silt loam, 2 to 5 percent slopes, eroded.** This deep, moderately well drained soil is on uplands.

Typically the surface layer is dark grayish brown silt loam about 5 inches thick. It is underlain by yellowish red and strong brown silty clay loam that is about 23 inches thick and has brownish and grayish mottles in the lower part. The next layer is clay mottled in shades of red, brown, and gray to a depth of 46 inches. Below this is light brownish gray silty clay mottled in shades of brown and red to a depth of 66 inches.

In most fields the surface layer has been thinned by erosion. Rills and gall spots are common. Included in areas mapped are a few areas that are severely eroded and a few small areas of Providence soils.

This soil is medium acid to very strongly acid. Permeability is slow. Runoff is medium. Available water capacity is high. The soil has fair tilth and can be worked throughout a fairly wide range of moisture conditions. The root zone is deep and is easily penetrated by plant roots to the clayey layer.

This soil has medium potential for row crops and small grains. Its potential is limited because of the size of the area and the depth to the clayey layer. It has high potential for hay and pasture. Returning crop residue to the soil helps maintain good tilth. Erosion is a moderate hazard if cultivated crops are grown. Minimum tillage, stripcropping, parallel terracing, and grassed waterways are practices that help reduce runoff and control erosion.

This soil has moderately high potential for loblolly pine, cherrybark oak, Shumard oak, sweetgum, and yellow poplar. There are no significant limitations for woodland use and management.

This soil has medium potential for most urban uses. The shrink-swell potential and low strength are limitations, but they can be overcome by good design and careful installation procedures. The clayey subsoil percs slowly, which is a limitation for septic tank absorption fields but can be partially overcome by increasing the size of the absorption area or by modifying the filter field. Capability unit IIe-2; woodland suitability group 3o7.

**TaC2—Tippah silt loam, 5 to 8 percent slopes, eroded.** This deep, moderately well drained soil is on uplands.

Typically the surface layer is dark grayish brown silt loam about 5 inches thick. It is underlain by yellowish red and strong brown silty clay loam that is about 23 inches thick and has brownish and grayish mottles in the lower part. The next layer is clay mottled in shades of red, brown, or gray to a depth of 46 inches. Below this is light brownish gray silty clay mottled in shades of brown and red to a depth of 66 inches.

In most fields the surface layer has been thinned by erosion and plowing has exposed the yellowish red or brown subsoil. There are small rills and a few shallow gullies in some fields. Included are a few areas that are severely eroded and a few areas of Providence and Ora soils.

This soil is medium acid to very strongly acid. Permeability is slow. Runoff is medium. Available water capacity is high. The soil has fair tilth and can be worked throughout a fairly wide range of moisture conditions. The root zone is deep and is easily penetrated by plant roots to the clayey layer.

This soil has medium potential for row crops and small grain. Its potential is limited because of the slope and the depth to the clayey layer. It has high potential for hay and pasture. Returning crop residue to the soil helps maintain good tilth. Erosion is a moderate hazard if cultivated crops are grown. Minimum tillage, stripcropping, parallel terracing, and grassed waterways are practices that help reduce runoff and control erosion.

This soil has moderately high potential for loblolly pine, cherrybark oak, Shumard oak, sweetgum, and yellow poplar. There are no significant limitations for woodland use or management.

This soil has medium potential for most urban uses. The shrink-swell potential and low strength are limitations, but they can be overcome by good design and careful installation procedures. The clayey subsoil percs slowly, which is a limitation for septic tank absorption fields but can be partially overcome by increasing the size of the absorption area or by modifying the filter field. Capability unit IIIe-3; woodland suitability group 3o7.

**TaC3—Tippah silt loam, 5 to 8 percent slopes, severely eroded.** This deep, moderately well drained soil is on uplands.

Typically the surface layer is yellowish brown silt loam about 4 inches thick. It is underlain by yellowish red and strong brown silty clay loam about 17 inches thick. The 21 to 28 inch layer is yellowish red silty clay loam with brownish and grayish mottles. It is underlain by mottled yellowish red, light olive brown, and gray clay to a depth of 66 inches.

In most fields the surface layer has been removed by erosion. There are many rills and common shallow gullies in most fields. Some deep gullies occur in places. Included in mapping are a few small areas of Providence and Ora soils.

This soil is medium acid to very strongly acid. Permeability is slow. Runoff is medium. Available water capacity is high. The soil has fair tilth and can be worked throughout a fairly wide range of moisture conditions. The root zone is deep and is easily penetrated by plant roots to the clayey layer.

This soil has low potential for row crops and small grain. Its potential is limited because of slope, severe erosion, and the depth to the clayey layer. It has medium potential for hay and pasture. Returning crop residue to the soil helps maintain tilth. Erosion is a severe hazard if

cultivated crops are grown. Minimum tillage, stripcropping, parallel terracing, and grassed waterways are practices that help reduce runoff and control erosion.

This soil has moderately high potential for loblolly pine, cherrybark oak, Shumard oak, sweetgum, and yellow poplar. There are no significant limitations for woodland use or management.

This soil has medium potential for most urban uses. The shrink-swell potential and low strength are the limitations, but they can be overcome by good design and careful installation procedures. The clayey subsoil percs slowly, which is a limitation for septic tank absorption fields but can be overcome by increasing the size of the absorption area or by modifying the filter field. Capability unit IVe-2; woodland suitability group 3o7.

**TaD2—Tippah silt loam, 8 to 12 percent slopes, eroded.** This deep, moderately well drained soil is on uplands.

Typically the surface layer is dark grayish brown silt loam about 5 inches thick. It is underlain by yellowish red and strong brown silty clay loam that is about 23 inches thick and has brownish and grayish mottles in the lower part. The next layer is clay mottled in shades of red, brown, and gray to a depth of 46 inches. Below this is light brownish gray silty clay mottled in shades of brown and red to a depth of 66 inches.

The surface layer has been thinned in most fields by erosion. Small rills and shallow gullies are common. Included in the area mapped are a few severely eroded areas. A few small areas of Providence and Ora soils are included.

This soil is medium acid to very strongly acid. Permeability is slow. Runoff is medium. Available water capacity is high. The soil has fair tilth and can be worked throughout a fairly wide range of moisture conditions. The root zone is deep and is easily penetrated by plant roots to the clayey layer.

This soil has low potential for row crops and small grain. Its potential is limited because of the slope and the depth to the clayey layer. It has medium potential for hay and pasture. Returning crop residue helps maintain good tilth. Erosion is a severe hazard if cultivated crops are grown. Minimum tillage, stripcropping, parallel terracing, and grassed waterways are practices that help reduce runoff and control erosion.

This soil has moderately high potential for loblolly pine, cherrybark oak, Shumard oak, sweetgum, and yellow poplar. There are no significant limitations for woodland use or management (fig. 5).

This soil has low potential for most urban uses. The shrink-swell potential, low strength, and slope are the limitations, but they can be overcome by good design and careful installation procedures. The clayey subsoil percs slowly, which is a limitation for septic tank absorption fields but can be overcome by increasing the size of the absorption area or by modifying the filter field. Capability unit IVe-2; woodland suitability group 3o7.

**Ur—Urbo silty clay loam.** This is a deep, somewhat poorly drained soil on flood plains. Slopes are 0 to 2 percent.

Typically the surface layer is dark grayish brown silty clay loam about 6 inches thick. It is underlain by grayish brown silty clay loam about 7 inches thick. The subsoil to a depth of about 72 inches is grayish brown silty clay with yellowish brown mottles in the upper part and olive brown and red mottles in the lower part.

Small areas of Arkabutla and Chenneby soils are included.

The soil is strongly acid to very strongly acid except where the surface layer has been limed. Permeability is very slow. Runoff and internal drainage are slow. The available water capacity is high. The soil has fair tilth, but can be worked within only a narrow range of moisture conditions because of the clayey texture. The root zone is deep, but penetration may be restricted by the texture.

This soil has high potential for row crops and small grain. Its potential is limited because it is subject to occasional flooding during periods of high rainfall. It has high potential for hay and pasture (fig. 6). Returning crop residue to the soil helps maintain the tilth. Surface field ditches and row arrangement are needed to remove excess surface water for crops and pasture.

This soil has very high potential for cherrybark oak, green ash, eastern cottonwood, and sweetgum. Wetness is the main limitation for woodland use or management.

This soil has low potential for most urban uses. The shrink-swell potential, low strength, and flood hazard are the limitations. Capability unit IIw-8; woodland suitability group 1w8.

**Ve—Verdun variant silt loam.** This is a deep, moderately well drained soil that is on low terraces. Slopes are 0 to 2 percent.

The surface layer is dark grayish brown silt loam about 4 inches thick. It is underlain by a grayish brown silt loam that has dark brown mottles and is about 3 inches thick. The 7 to 20 inch layer is yellowish brown silty clay loam with yellowish brown and light brownish gray mottles. The next layer to a depth of 75 inches is silty clay loam or silt loam mottled in shades of gray and brown.

Small areas of Bonn and Bude soils are included in mapping.

The soil is slightly acid to strongly alkaline. Permeability is very slow. The available water capacity is high. The soil has fair tilth and can be worked throughout a fairly wide range of moisture conditions. The root zone is deep, but root penetration may be restricted because of the high sodium content.

This soil has low potential for row crops, small grains, and pasture. Its potential is limited because of the high sodium content in the subsoil.

This soil has low potential for loblolly pine and shortleaf pine. The high sodium content in the subsoil is a limitation for woodland use and management.

This soil has low potential for most urban uses. The shrink-swell potential, low strength, wetness, and high

sodium content in the subsoil are limitations. Capability unit IVs-1; woodland suitability group 5t3.

**WlB2—Wilcox silty clay loam, 2 to 5 percent slopes, eroded.** This is a moderately deep, somewhat poorly drained soil that is on uplands.

Typically the surface layer is dark brown silty clay loam 4 inches thick. It is underlain by reddish brown silty clay loam that has grayish and brownish mottles and is about 4 inches thick. The next layer is silty clay mottled in shades of red, gray, and brown to a depth of 44 inches. The next layer is gray clay with brownish mottles to a depth of 50 inches. The 50 to 72 inch layer is stratified gray, pale olive, and light olive brown soft shale.

In most fields the surface layer has been thinned by erosion and plowing has exposed the brown or red subsoil. Small rills and a few shallow gullies occur in some fields. Included in areas mapped are a few areas that have a silt loam surface texture, a few areas that are severely eroded, and a few that are slightly eroded. Small areas of Tippah and Falkner soils are also included.

The soil is strongly acid to extremely acid except where the surface layer has been limed. Permeability is very slow. Available water capacity is high. The soil has poor tilth and can be worked within only a narrow range of moisture conditions. The root zone is deep, but may be difficult to penetrate because of the clayey texture.

This soil has medium potential for row crops and small grain. Its potential is limited because of the clayey texture of the subsoil. It has medium potential for hay and pasture. Returning crop residue to the soil helps maintain tilth. Erosion is a moderate hazard if cultivated crops are grown. Minimum tillage, stripcropping, terracing, and grassed waterways are practices that help reduce runoff and control erosion.

This soil has moderately high potential for loblolly pine and shortleaf pine. The clayey texture is the limitation for woodland use and management.

This soil has low potential for most urban uses. The shrink-swell potential and low strength are the limitations, but can be overcome by special design and careful installation procedures. The clayey subsoil percs slowly, which is a limitation for septic tank absorption fields. Capability unit IIIe-4; woodland suitability group 3c2.

**WlC2—Wilcox silty clay loam, 5 to 12 percent slopes, eroded.** This is a moderately deep, somewhat poorly drained soil that is on uplands.

Typically the surface layer is dark brown silty clay loam 4 inches thick. It is underlain by reddish brown silty clay loam that has grayish and brownish mottles and is about 4 inches thick. The next layer is silty clay mottled in shades of red, gray, and brown to a depth of 44 inches. The next layer is gray clay with brownish mottles to a depth of 50 inches. The 50 to 72 inch layer is stratified gray, pale olive, and light olive brown soft shale.

In most fields the surface layer has been thinned by erosion. A few small rills and shallow gullies are in some areas. Where this soil is cultivated, the mottled subsoil in a few areas is exposed and the plow layer includes some of the upper part of the subsoil. Included are small areas that are severely eroded. Small areas of Falkner, Maben, and Tippah soils are also included.

The soil is strongly acid to extremely acid except where the surface layer has been limed. Permeability is very slow. Available water capacity is high. Runoff is rapid. The soil has poor tilth and can be worked within only a narrow range of moisture conditions. The root zone is deep, but may be difficult to penetrate because of the clayey texture.

This soil has low potential for row crops and small grain. Its potential is limited because of the slope and the clayey texture of the subsoil. It has medium potential for hay and pasture.

This soil has moderately high potential for loblolly pine and shortleaf pine. The clayey texture is the limitation for woodland use and management.

This soil has low potential for most urban uses. The shrink-swell potential and slope are limitations, but can be overcome by special design and careful installation procedures. The clayey subsoil percs slowly, which is a limitation for septic tank absorption fields. Capability unit VIe-3; woodland suitability group 3c2.

## Planning the Use and Management of the Soils

The soil survey is a detailed analysis and evaluation of the most basic resource of the survey area—the soil. It may be used to fit the use of the land, including urbanization, to the limitations and potentials of the natural resources and the environment and to help avoid soil-related failures in uses of the land.

During a soil survey, soil scientists, conservationists, engineers, and others keep extensive notes, not only about the nature of the soils but also about unique aspects of behavior of these soils in the field and at construction sites. These notes include observations of erosion, drought damage to specific crops, yield estimates, flooding, the functioning of septic systems, and other factors relating to the kinds of soil and their productivity, potentials, and limitations under various uses and management. In this way field experience incorporated with measured data on soil properties and performance is used as a basis for predicting soil behavior.

Information in this section is useful in applying basic facts about the soils to plans and decisions for use and management of soils for crops and pasture, woodland, and many nonfarm uses, including building sites, highways and other transportation systems, sanitary facilities, parks and other recreational developments, and wildlife habitat. From the data presented, the potential of each soil for specified land use can be determined, soil limitations can be identified, and costly failures in homes and other structures, because of unfavorable soil properties, can be avoided. A site can be selected where soil properties are favorable, or practices can be planned that will overcome the soil limitations.

Planners and others using the soil survey can evaluate the impact of specific land uses on the overall productivity of the survey area or other broad planning area, and on the environment. These factors are closely related to the nature of the soil. Plans can be made to maintain or create a land use pattern in harmony with the natural soil.

Contractors can find information useful in locating sources of sand and gravel, road fill, and topsoil. Other information indicates the presence of bedrock, wetness, or very firm soil horizons that cause difficulty in excavation.

Health officials, highway officials, engineers, and many other specialists can find useful information in this soil survey. The safe disposal of wastes, for example, is closely related to properties of the soil. Pavements, sidewalks, campsites, playgrounds, lawns, and trees and shrubs are all influenced by the nature of the soil.

## Crops and Pasture

By HERMAN S. SAUCIER, agronomist, Soil Conservation Service.

The major management concerns when using the soils for crops and pasture are described in this section. In addition, the crops or pasture plants best adapted to the soil in the survey area are discussed; the system of land capability classification used by the Soil Conservation Service is explained; and the predicted yields of the main crops, hay, and pasture are presented for each soil.

This section provides information about the overall agricultural potential and needed practices in the survey area for those in the agribusiness sector—equipment dealers, drainage contractors, fertilizer companies, processing companies, planners, conservationists, and others. For each kind of soil, information about management is presented in the section "Soil Maps for Detailed Planning." Plans for management systems for individual fields or farms should also consider the detailed information given in the description of each soil.

More than 77,000 acres in the survey area was used for crops and pasture in 1967, according to the Conservation Needs Inventory (*9*). Of this total, 39,000 acres was used for permanent pasture; 38,000 acres for row crops, mainly cotton, soybeans, and corn; and 1,100 acres for rotation hay and pasture. The rest was idle cropland.

*Soil erosion* is the major soil problem on about one-third of the cropland and pasture in Webster County. If the slope is more than 2 percent, erosion is a hazard.

Loss of the surface layer through erosion is damaging for two reasons. Productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging on soils with a clayey subsoil, such as the Falkner, Maben, Sweatman, Tippah, and Wilcox soils, and on soils with a layer in or below the subsoil that limits the depth of the root zone. Such layers include fragipans, as in Ora, Prentiss, and Providence soils. Also, soil erosion on farmland results in sediment entering streams. Control of erosion minimizes the pollution of streams by sediment and improves quality of water for recreation and for fish and wildlife.

In some sloping fields, tilling or preparing a good seedbed is difficult on clayey or hardpan spots because the original friable surface soil has been eroded away. Such spots are in areas of severely eroded Providence and Tippah soils.

Erosion control provides a protective surface cover, reduces runoff, and increases infiltration. A cropping system that keeps a plant cover on the soil for extended periods can hold soil erosion losses to amounts that will not reduce the productive capacity of the soils. On livestock farms, which require pasture and hay, the legume and grass forage crops in the cropping system reduce erosion on sloping land and also provide nitrogen and improve tilth for the following crop.

Minimizing tillage and leaving crop residue on the surface increase infiltration and reduce the hazards of runoff and erosion. These practices can be adapted to most soils in the survey area, but are more difficult to use successfully on the eroded soils and on the Wilcox soils that have a clayey surface layer. Minimum tillage is effective in reducing erosion on sloping land and can be adapted to most soils in the survey area.

Terraces and diversions reduce the length of slope and thus reduce runoff and erosion. They are most practical on soils that have regular slopes. Ora, Providence, and Tippah soils are suitable for terraces (fig. 7).

Contouring and contour stripcropping are used as erosion control practices in the survey area. They are best adapted to soils with smooth, uniform slopes.

Information for the design of erosion control practices for each kind of soil can be found in the Technical Guide, available in local offices of the Soil Conservation Service.

*Soil drainage* is the major management need on some of the acreage used for crops and pasture in the survey area. Some soils are so wet that the production of crops common to the area is generally not possible. The poorly drained Guyton and Ozan soils, for example, make up about 4,300 acres in the survey area.

Unless artificially drained, the somewhat poorly drained soils are so wet that crops are damaged some years. In this category are the Arkabutla, Bude, Chenneby, Falkner, Longview, Stough, and Urbo soils, which make up about 32,000 acres.

Ariel, Bruno, Cascilla, and Jena soils have good natural drainage most of the year. Small areas of wetter soils along drainageways and in swales are commonly included in areas of the moderately well drained Oaklimeter soils. Artificial drainage is needed in some of these wetter areas.

*Soil fertility* is naturally low in most soils of the uplands in the survey area. All but Bonn and Verdun soils are naturally acid. The soils on flood plains, such as Ariel, Arkabutla, Bruno, Cascilla, Chenneby, Jena, Oaklimeter, and Urbo soils, are naturally higher in plant nutrients than most upland soils.

Many upland soils are naturally strongly acid. If they have never been limed, applications of ground limestone are needed to raise the pH level sufficiently for good plant growth. Available phosphorus and potash levels are naturally low in most of these soils. On all soils additions of lime and fertilizer should be based on the results of soil tests, on the need of the crop, and on the expected level of yields. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime to apply.

*Soil tilth* is an important factor in the germination of seeds and in the infiltration of water into the soil. Soils with good tilth are granular and porous.

Most of the soils used for crops in the survey area have a silt loam surface layer that is light in color and low in content of organic matter. Generally the structure of such soils is weak, and intense rainfall causes the formation of a crust on the surface. The crust is hard when dry and is nearly impervious to water. Once the crust forms, it reduces infiltration and increases runoff. Regular additions of crop residue, manure, and other organic material can help to improve soil structure and to reduce crust formation.

Fall plowing is generally not a good practice on soils that have a silt loam surface layer because of the crust that forms during the winter and spring. Many of the soils are nearly as dense and hard at planting time after fall plowing as they were before they were plowed. Also, about one-third of the cropland consists of sloping soils that are subject to damaging erosion if they are plowed in fall.

The Urbo and Wilcox soils are clayey, and tilth is a problem because the soils often stay wet until late in spring. If they are wet when plowed, they tend to be very cloddy when dry and good seedbeds are difficult to prepare. Fall plowing generally results in good tilth in the spring.

*Field crops* suited to the soils and climate of the survey area include many that are not now commonly grown. Cotton, soybeans, and corn are the principal row crops. Grain sorghum, peanuts, potatoes, and similar crops can be grown if economic conditions are favorable.

Wheat and oats are the common close-growing crops.

Latest information and suggestions for growing special crops can be obtained from local offices of the Cooperative Extension Service and the Soil Conservation Service.

In general, in the survey area the upland soils that are well suited to crops are also suited to urban development. The data about specific soils in this soil survey can be used in planning future land use patterns. Potential productive capacity in farming should be weighed against soil limitations and potential for nonfarm development.

## Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in table 5 because of seasonal variations in rainfall and other climatic factors. Absence of a yield estimate indicates that the crop is not suited to or not commonly grown on the soil or that irrigation of a given crop is not commonly practiced on the soil.

The predicted yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Results of field trials and demonstrations and available yield data from nearby counties were also considered.

The latest soil and crop management practices used by many farmers in the county are assumed in predicting the yields. Hay and pasture yields are predicted for varieties of grasses and legumes suited to the soil. A few farmers may be using more advanced practices and are obtaining average yields higher than those shown in table 5.

The management needed to achieve the indicated yields of the various crops depends on the kind of soil and the crop. Such management provides drainage, erosion control, and protection from flooding; proper planting and seeding rates; suitable high-yielding crop varieties; appropriate tillage, including timely tillage and seedbed preparation and tilling when soil moisture is favorable; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residues, barnyard manure, and green-manure crops; harvest with the smallest possible loss; and timely fieldwork.

The predicted yields reflect the productive capacity of the soils for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but because their acreage is small, predicted yields for these crops are not included. The local offices of the Soil Conservation Service and the Cooperative Extension Service can provide information about the productivity and management concerns of the soils for these crops.

## Capability Classes and Subclasses

Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The soils are grouped according to their limitations when they are used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils. This classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for forest trees, or for engineering purposes.

In the capability system, all kinds of soils are grouped at three levels: capability class, subclass, and unit. These levels are defined in the following paragraphs.

CAPABILITY CLASSES, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use, defined as follows:

Class I soils have few limitations that restrict their use. (None in Webster County).

Class II soils have moderate limitations that reduce the choice of plants or require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use. (None in Webster County).

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and landforms have limitations that nearly preclude their use for commercial plants. (None in Webster County).

CAPABILITY SUBCLASSES are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses, because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w*, *s*, or *c* because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use to pasture, range, woodland, wildlife habitat, or recreation.

The capability unit is identified in the description of each soil mapping unit in the section "Soil Maps for Detailed Planning." Capability units are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-2 or IIIe-4.

## Woodland

JOSEPH V. ZARY, forester, Soil Conservation Service, assisted in preparing this section.

This section contains information on the relationship between trees and their environment and particularly trees and the soils on which they grow. It also includes information on the kind, amount, and condition of woodland resources and the industries they support. The following interpretations of the soils can be used by owners of woodland, foresters, forest managers, and agricultural workers to develop and carry out plans for profitable tree farming.

### Trees and Environment

The total environment of the tree is a complex integration of numerous interrelated physical and biological factors (*8*). Physical factors are those of the climate, such as various measures of radiation, of precipitation, and of movement and composition of the air; and factors of the soil, such as texture, structure and depth, moisture capacity and drainage, nutrient content, and topographic position. Biological factors are the plant associates; the larger animals that use the forest as a source of food and shelter; the many small animals that use the forest as a source of food and shelter; the many small animals, insects, and insectlike animals; the fungi to which the trees are hosts; and the myriads of micro-organisms in the soil, the functions of many of which are beneficial to the tree.

### Tree and Soil Relationships

Possibly the most important environmental factor influencing tree growth and woodland species composition is soil. In addition to being a reservoir for moisture for a tree, soil provides all the essential elements required in growth except those derived from the atmosphere, carbon dioxide and oxygen (*8*). Obviously, also, soil provides the medium in which a tree is anchored. The many characteristics of soil, such as chemical composition, texture, structure, depth, and position, affect the growth of a tree to the extent to which they affect the supply of moisture and nutrients.

A number of studies have shown strong correlations between productivity of site, or growth of trees, and various soil characteristics, such as depth and position on the slope. The relationships are often indirect.

The ability of a soil to supply water and nutrients to trees is strongly related to its texture, structure, and depth. Sands contain only a small amount of plant nutrients and are low in available water capacity. Many fine textured soils are high in plant nutrients and have high available water capacity. Aeration is impeded in clays, however, particularly under wet conditions, so that metabolic processes requiring oxygen in the roots are inhibited.

The position on slope strongly influences species composition. Moisture-loving species, such as sweetgum and yellow-poplar, thrive on moderately moist, well drained sandy soils on lower to middle slopes, in coves, and in areas adjoining streams, whereas less demanding species, such as oaks, hickories, and pines, grow well on middle slopes and moderately well on upper slopes and ridges.

Practices that help to prevent the destruction of organic matter and the compaction of soil are important in maintaining suitable conditions of soil moisture and aeration. Such practices as (1) sanitation cutting to remove trees killed or injured by fire, insects, and fungi; (2) improvement cutting for the purpose of improving species composition and stand condition; and (3) thinning to increase rate of growth, improve composition, and foster quality all result in long-term increases in total yield and income as well as exerting beneficial influences on woodland soils and environment.

### Woodland Resources

An area of approximately 165,200 acres, or 62 percent, of the total land area of 266,200 acres in Webster County is classified as commercial forest (*13*). Commercial forest land is defined as forest land that is producing or is capable of producing crops of industrial wood and not withdrawn from timber utilization. This commercial forest is divided into classes of ownership as follows: A total of 92,200 acres is owned by farmers, 48,000 acres is owned by miscellaneous private owners, 22,700 acres is controlled by forest industry, and 2,300 acres is in public ownership (*12, 14*).

According to the 1967 Conservation Needs Inventory for Mississippi, only 16,520 acres, or 10 percent, of the 165,200 acres of commercial forest land was considered to have "adequate treatment" (*9*). The remaining 90 percent, or 148,680 acres, is in need of further conservation treatment. Tree planting, site preparation, natural seeding, and direct seeding were needed on 45,031 acres. Release, salvage, and sanitation cuttings and thinning were needed on 103,649 acres. The treatments and practices mentioned are especially needed on woodlands under farmer and miscellaneous ownership, a total of 140,200 acres. Generally these woodlands throughout the county are receiving low to medium levels of management and are producing far less than their growth potentials. Establishment of the needed practices would nearly double present yields of tree crops and greatly increase income of the woodland owners.

The commercial forest can be classified as forest types, which are stands of trees of similar character and of the same species, growing under the same ecological and biological conditions. These forest types are named for the species present in the greatest abundance and frequency (*6*).

On this basis, the oak-hickory forest type, composed mainly of upland oaks and hickories, is most important. It occupies approximately 73,000 acres throughout the county. Common associates in this forest type are maple, elm, yellow-poplar, and some pine and black walnut (*6, 11, 12*).

Loblolly-shortleaf pine forest type, composed of loblolly pine or shortleaf pine, singly or in combination, is of second importance. It occupies approximately 59,400 acres. Common associates are oak and hickory species, sweetgum, and blackgum.

The oak-pine forest type, composed mainly of upland oaks and mixtures of loblolly and shortleaf pines, ranks third in importance. It occupies about 26,000 acres. Common associates are sweetgum, blackgum, hickory species, and yellow-poplar.

The three forest types mentioned make up 158,400 acres, or about 96 percent, of the total commercial forest acreage in the county. These forest types are so intermingled that it would be difficult to delineate the individual forest types either on a map or otherwise by geographic description.

The oak-gum-cypress forest type, composed mainly of bottom-land hardwoods, such as tupelo, blackgum, sweetgum, oaks, and southern cypress, singly or in combination, ranks fourth in importance. It occupies about 6,800 acres. Common associates include willow, ash, elm, hackberry, maple, and cottonwood (*13*). The southern cypress component is relatively unimportant in Webster County. This forest type is mainly in the southwestern part of the county on the bottom lands of the Big Black River and its principal tributary, Calabrella Creek. Small areas can also be found along the headwaters of Sabougla Creek in the northwestern part of the county, Shutispear and Topashaw Creeks in the north-central part, and the minor tributaries of Line and Sun Creeks, which originate in the northeastern and souheastern parts of the county, respectively.

By 1967, the woodlands of Webster County supported a total of 323.1 million board feet of sawtimber, including 169.6 million board feet of softwood (pine) and 153.5 million board feet of hardwood (*12*). The hardwood component included 117.2 million board feet of other hardwoods. Growing stock of all species totaled 124.6 million cubic feet, including 63.7 million cubic feet of softwood, mainly pine, and 60.9 million cubic feet of hardwood. The hardwood volume included 41.5 million cubic feet of oak, 9.8 million cubic feet of gum, and 9.6 million cubic feet of other hardwoods.

Also by 1967, the woodlands supported 1,758,000 cords of growing stock, all species included. This volume included 849,000 cords of softwood, mainly pine, and 909,000 cords of hardwood. The hardwood volume included 620,000 cords of oak, 146,000 cords of gum, and 143,000 cords of other hardwoods.

In 1966, the net annual growth of growing stock on the commercial forest land of Webster County was 8.6 million cubic feet for all species (*12*). This volume included 5.7 million cubic feet of softwood, mainly pine, and 2.9 million cubic feet of hardwood. The hardwood volume included 1.9 million cubic feet of oak, 0.6 million cubic feet of gum, and 0.4 million cubic feet of other hardwoods.

Also in 1966, the net annual growth of sawtimber on the commercial forest land of the county was 22.2 million board feet for all species. This volume included 16.0 million board feet of softwood (pine) and 6.2 million board feet of hardwood. The hardwood component included 3.6 million board feet of oak, 1.5 million board feet of gum, and 1.1 million board feet of other hardwoods.

Timber removal from growing stock on the commercial forest land in 1966 was 2.9 million cubic feet for all species (*12*). This volume included 1.9 million cubic feet of softwood, all pine, and 1.0 million cubic feet of hardwood. The hardwood volume included 0.6 million cubic feet of oak, 0.2 million cubic feet of gum, and 0.2 million cubic feet of other hardwood.

In 1972, standard cords of round pulpwood produced on the commercial forest land of Webster County totaled 42,745 (*15, 16*). Of this volume, 30,488 standard cords was softwood and 12,257 standard cords was hardwood. During the same year, sawlog production amounted to 6,380,000 board feet. Of this volume, 3,683,000 board feet was softwood (pine) and 2,697,000 board feet was hardwood.

Commercial forest land and the tree crops harvested support a substantial timber economy. In 1972, there were five small sawmills, each with an annual output of less than 3 million board feet (*15*). There were also two furniture plants, two pulpwood yards, and one small business manufacturing bows and arrows. Other wood-using industries and pulpwood yards in adjoining counties utilize some of the wood produced in Webster County.

Besides furnishing raw material for the wood-using industries and affording employment for hundreds of industrial workers, the commercial forest land of Webster County provides food and shelter for wildlife and offers opportunity for recreation to many users annually. Moreover, this forest land provides watershed protection, helps to arrest soil erosion and reduce sedimentation, enhances the quality and value of water resources, and furnishes a limited amount of native forage for livestock.

### Woodland Management and Productivity

Table 6 contains information useful to woodland owners or forest managers planning use of soils for wood crops. Mapping unit symbols for those soils suitable for wood crops are listed alphabetically by soil name, and the ordination symbol for each soil is given. All soils bearing the same ordination symbol require the same general kinds of woodland management and have about the same potential productivity.

The first part of the symbol, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *t*, toxic substances in the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *s*, sandy texture; *f*, high content of coarse fragments in the soil profile; and *r*, steep slopes. The letter *o* indicates no significant limitations or restrictions. If a soil has more than one limitation, priority in placing the soil into a limitation class is in the order in which the letters are listed—x, w, t, d, c, s, f, and r.

The third part of the symbol indicates the degree of hazard or limitation and the general suitability of the soils for certain kinds of trees.

The *numeral 1* indicates that the soils have no significant limitation and are best suited to needleleaf trees (pines or redcedar).

The *numeral 2* indicates that the soils have a slight to moderate limitation and are best suited to needleleaf trees.

The *numeral 3* indicates that the soils have a moderate to severe limitation and are best suited to needleleaf trees.

The *numeral 4* indicates that the soils have no significant limitation and are best suited to broadleaf trees.

The *numeral 5* indicates that the soils have a slight to moderate limitation and are best suited to broadleaf trees.

The *numeral 6* indicates that the soils have a moderate to severe limitation and are best suited to broadleaf trees.

The *numeral 7* indicates suitability for both needleleaf and broadleaf trees and no significant limitation.

The *numeral 8* indicates suitability for both needleleaf and broadleaf trees and a slight to moderate limitation.

The *numeral 9* indicates suitability for both needleleaf and broadleaf trees and a moderate to severe limitation.

The *numeral 0* indicates that the soils are not suitable for the production of commercial wood crops.

In table 6 the soils are also rated for a number of factors to be considered in management. The ratings of slight, moderate, and severe are used to indicate the degree of major soil limitations.

Ratings of the hazard of erosion indicate the risk of loss of soil in well-managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if some measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of equipment limitation reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or equipment; *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree that the soil affects expected mortality of planted tree seedlings when plant competition is not a limiting factor. The ratings are for seedlings from good planting stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality of the planted seedlings is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of plant competition indicate the degree to which undesirable plants are expected to invade or grow

if openings are made in the tree canopy. The invading plants compete with native plants or planted seedlings by impeding or preventing their growth. A rating of *slight* indicates little or no competition from other plants; *moderate* indicates that plant competition is expected to hinder the development of a fully stocked stand of desirable trees; *severe* means that plant competition is expected to prevent the establishment of a desirable stand unless the site is intensively prepared, weeded, or otherwise managed for the control of undesirable plants.

The potential productivity of merchantable trees on a soil is expressed as a site index. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands.

*Trees to plant* are those that are suitable for commercial wood production and that are suited to the soils.

## Engineering

By BOBBY E. PIERCE, engineer, Soil Conservation Service.

This section provides information about the use of soils for building sites, sanitary facilities, construction materials, and water management. Among those who can benefit from this section are engineers, landowners, community decision makers and planners, town and city managers, land developers, builders, contractors, and farmers and ranchers.

The ratings in tables in this section are based on test data and estimated data in the "Soil Properties" section. The ratings were determined jointly by soil scientists and engineers of the Soil Conservation Service using known relationships between the soil properties and the behavior of soils in various engineering uses.

Among the soil properties and site conditions identified by the soil survey and used in determining the ratings in this section are grain-size distribution, liquid limit, plasticity index, soil reaction, depth to and hardness of bedrock within 5 or 6 feet of the surface, soil wetness characteristics, depth to a seasonal water table, slope, likelihood of flooding, natural soil structure or aggregation, in-place soil density, and geologic origin of the soil material. Where pertinent, data about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of absorbed cations were also considered.

Based on the information assembled about soil properties, ranges of values may be estimated for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, shear strength, compressibility, slope stability, and other factors of expected soil behavior in engineering uses. As appropriate, these values may be applied to each major horizon of each soil or to the entire profile.

These factors of soil behavior affect construction and maintenance of roads, airport runways, pipelines, foundations for small buildings, ponds and small dams, irrigation projects, drainage systems, sewage and refuse disposal systems, and other engineering works. The ranges of values can be used to—(1) select potential residential, commercial, industrial, and recreational areas; (2) make preliminary estimates pertinent to construction in a particular area; (3) evaluate alternate routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternate sites for location of sanitary landfills, onsite sewage disposal systems, and other waste disposal facilities; (5) plan detailed onsite investigations of soils and geology; (6) find sources of gravel, sand, clay, and topsoil; (7) plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; (8) relate performance of structures already built to the properties of the kinds of soil on which they are built so that performance of similar structures on the same or a similar soil in other locations can be predicted; and (9) predict the trafficability of soils for cross-country movement of vehicles and construction equipment.

*Data presented in this section are useful for land-use planning and for choosing alternative practices or general designs that will overcome unfavorable soil properties and minimize soil-related failures. Limitations to the use of these data, however, should be well understood. First, the data are generally not presented for soil material below a depth of 5 or 6 feet. Also, because of the scale of the detailed map in this soil survey, small areas of soils that differ from the dominant soil may be included in mapping. Thus, these data do not eliminate the need for onsite investigations and testing.*

The information is presented mainly in tables. Table 7 shows, for each kind of soil, ratings of the degree and kind of limitations for building site development; table 8, for sanitary facilities; and table 9, for water management. Table 10 shows the suitability of each kind of soil as a source of construction material.

The information in the tables, along with the soil map, the soil descriptions, and other data provided in this survey can be used to make additional interpretations and to construct interpretive maps for specific uses of land.

Some of the terms used in this soil survey have different meanings in soil science and in engineering; the Glossary defines many of these terms.

### Building Site Development

The degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, and local roads and streets are indicated in table 7. A *slight* limitation indicates that soil properties are favorable for the specified use; any limitation is minor and easily overcome. A *moderate* limitation indicates that soil properties and site features are unfavorable for the specified use, but the limitations can be overcome or minimized by special planning and design. A *severe* limitation indicates that one or more soil properties or site features are so unfavorable or difficult

to overcome that a major increase in construction effort, special design, or intensive maintenance is required. For some soils rated severe, such costly measures may not be feasible.

*Shallow excavations* are used for pipelines, sewerlines, telephone and power transmission lines, basements, and open ditches. Such digging or trenching is influenced by soil wetness caused by a seasonal high water table, the texture and consistence of soils, the tendency of soils to cave in or slough, and the presence of very firm, dense soil layers, bedrock, or large stones. In addition, excavations are affected by slope of the soil and the probability of flooding. Ratings do not apply to soil horizons below a depth of 6 feet unless otherwise noted.

In the soil series descriptions, the consistence of each soil horizon is defined, and the presence of very firm or extremely firm horizons, usually difficult to excavate, is indicated.

*Dwellings* and *small commercial buildings* referred to in table 7 are built on undisturbed soil and have foundation loads of a dwelling no more than three stories high. Separate ratings are made for small commercial buildings without basements and for dwellings with and without basements. For such structures, soils should be sufficiently stable that cracking or subsidence from settling or shear failure of the foundation do not occur. These ratings were determined from estimates of the shear strength, compressibility, and shrink-swell potential of the soil. Soil texture, plasticity and in-place density, potential frost action, soil wetness, and depth to a seasonal high water table were also considered. Soil wetness and depth to a seasonal high water table indicate potential difficulty in providing adequate drainage for basements, lawns, and gardens. Depth to bedrock, slope, and the large stones in or on the soil are also important considerations in the choice of sites for these structures and were considered in determining the ratings. Susceptibility to flooding is a serious limitation.

*Roads and streets* referred to in table 7 have an all-weather surface that can carry light to medium traffic all year. They consist of a subgrade of the underlying soil material; a base of gravel, crushed rock fragments, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. The roads are graded with soil material at hand, and most cuts and fills are less than 6 feet deep.

The load supporting capacity and the stability of the soil as well as the quantity and workability of fill material available are important in design and construction of roads and streets. The AASHTO and Unified classifications of the soil and the soil texture, density, shrink-swell potential, and potential frost action are indicators of the traffic supporting capacity used in making the ratings. Soil wetness, flooding, slope, depth to hard rock or very compact layers, and content of large stones, all of which affect stability and ease of excavation, were also considered.

## Sanitary Facilities

Favorable soil properties and site features are needed for proper functioning of septic tank absorption fields, sewage lagoons, and sanitary landfills. The nature of the soil is important in selecting sites for these facilities and in identifying limiting soil properties and site features to be considered in design and installation. Also, those soil properties that deal with the ease of excavation or installation of these facilities will be of interest to contractors and local officials. Table 8 shows the degree and kind of limitations of each soil for these uses and for use of the soil as daily cover for landfills.

If the degree of soil limitation is indicated by the rating *slight*, soils are favorable for the specified use and limitations are minor and easily overcome; if *moderate*, soil properties or site features are unfavorable for the specified use, but limitations can be overcome by special planning and design; and if *severe*, soil properties or site features are so unfavorable or difficult to overcome that major soil reclamation, special designs, or intensive maintenance is required.

*Septic tank absorption fields* are subsurface systems of tile or perforated pipes that distribute effluent from a septic tank into the natural soil. Only the soil horizons between depths of 18 and 72 inches are evaluated for this use. The soil properties and site features considered are those that affect the absorption of the effluent and those that affect the construction of the system.

Properties and features that effect the absorption of the effluent are permeability, depth to seasonal high water table, depth to bedrock, and susceptibility to flooding. Stones, boulders, and a shallow depth to bedrock interfere with installation. Excessive slope can cause lateral seepage and surfacing of the effluent in downslope areas. Also, soil erosion and soil slippage are hazards where absorption fields are installed in sloping soils.

Some soils are underlain by loose sand and gravel or fractured bedrock at a depth less than 4 feet below the tile lines. In these soils the absorption field does not adequately filter the effluent, and as a result ground water supplies in the area may be contaminated.

Percolation tests are performed to determine the absorptive capacity of the soil and its suitability for septic tank absorption fields. These tests should be performed during the season when the water table is highest and the soil is at minimum absorptive capacity.

In many of the soils that have moderate or severe limitations for septic tank absorption fields, it may be possible to install special systems that lower the seasonal water table or to increase the size of the absorption field so that satisfactory performance is achieved.

*Sewage lagoons* are shallow ponds constructed to hold sewage while bacteria decompose the solid and liquid wastes. Lagoons have a nearly level flow area surrounded by cut slopes or embankments of compacted, nearly impervious soil material. They generally are designed so that depth of the sewage is 2 to 5 feet. Impervious soil at

least 4 feet thick for the lagoon floor and sides is required to minimize seepage and contamination of local ground water. Soils that very are high in organic matter and those that have stones and boulders are undesirable. Unless the soil has very slow permeability, contamination of local ground water is a hazard in areas where the seasonal high water table is above the level of the lagoon floor. In soils where the water table is seasonally high, seepage of ground water into the lagoon can seriously reduce its capacity for liquid waste. Slope, depth to bedrock, and susceptibility to flooding also affect the location of sites for sewage lagoons or the cost of construction. Shear strength and permeability of compacted soils affect the performance of embankments.

*Sanitary landfill* is a method of disposing of solid waste, either in excavated trenches or on the surface of the soil. The waste is spread compacted in layers and covered with thin layers of soil. Landfill areas are subject to heavy vehicular traffic. Ease of excavation, risk of polluting ground water, and trafficability affect the suitability of a soil for this purpose. The best soils have a loamy or silty texture, have moderate or slow permeability, are deep to bedrock and a seasonal water table, are free of large stones and boulders, and are not subject to flooding. In areas where the seasonal water table is high, water seeps into the trenches and causes problems in excavating and filling the trenches. Also, seepage into the refuse increases the risk of pollution of ground water. Clayey soils are likely to be sticky and difficult to spread. Sandy or gravelly soils generally have rapid permeability that might allow noxious liquids to contaminate local ground water.

Unless otherwise stated, the ratings in table 8 apply only to soil properties and features within a depth of about 6 feet. If the trench is deeper, ratings of slight or moderate may not be valid. Site investigation is needed before a site is selected.

In the area type of sanitary landfill, refuse is placed on the surface of the soil in successive layers. The limitations caused by soil texture, depth to bedrock, and stone content do not apply to this type of landfill. Soil wetness, however, may be a limitation because of difficulty in operating equipment.

*Daily cover for sanitary landfills* should be soil that is easy to excavate and spread over the compacted fill during both wet and dry weather. Soils that are loamy or silty and free of stones or boulders are better than other soils. Clayey soils may be sticky and difficult to spread; sandy soils may be subject to soil blowing.

In addition to these features, the soils selected for final cover of landfills should be suitable for growing plants. In comparison with other horizons, the A horizon in most soils has the best workability, more organic matter, and the best potential for growing plants. Thus, for either the area- or trench-type landfill, stockpiling material from the A horizon for use as the surface layer of the final cover is desirable.

Where it is necessary to bring in soil material for daily or final cover, thickness of suitable soil material available and depth to a seasonal high water table in soils surrounding the sites should be evaluated. Other factors to be evaluated are those that affect reclamation of the borrow areas, such as slope, erodibility, and potential for plant growth.

## Water Management

Many soil properties and site features that affect water management practices have been identified in this soil survey. In table 9 the degree of soil limitation and soil and site features that affect use are indicated for each kind of soil. This information is significant in planning, installing, and maintaining water control structures.

Soil and site limitations are expressed as slight, moderate, and severe. *Slight* means that the soil properties and site features are generally favorable for the specified use and that any limitation is minor and easily overcome. *Moderate* means that some soil properties or site features are unfavorable for the rated use but can be overcome or modified by special planning and design. *Severe* means that the soil properties and site features are so unfavorable and so difficult to correct or overcome that major soil reclamation, special design, or intensive maintenance is required.

*Pond reservoir areas* hold water behind a dam or embankment. Soils suitable for this use have low seepage potential, which is determined by the permeability and depth over fractured or permeable bedrock or other permeable material.

*Embankments, dikes, and levees* require soil material that is resistant to seepage, erosion, and piping and is of favorable stability, shrink-swell potential, shear strength, and compaction characteristics. Stones and organic matter in a soil downgrade the suitability of a soil for use in embankments, dikes, and levees.

*Drainage* of soil is affected by such soil properties as permeability, texture, structure, depth to claypan or other layers that influence rate of water movement, depth to the water table, slope, stability of ditchbanks, susceptibility to flooding, salinity and alkalinity, and availability of outlets for drainage.

*Irrigation* is affected by such features as slope, susceptibility to flooding, hazards of water erosion and soil blowing, texture, presence of salts and alkali, depth of root zone, rate of water intake at the surface, permeability of the soil below the surface layer, available water capacity, need for drainage, and depth to the water table.

*Terraces and diversions* are embankments, or a combination of channels and ridges, constructed across a slope to intercept runoff and allow the water to soak into the soil or flow slowly to an outlet. Features that affect suitability of a soil for terraces are uniformity of slope and steepness, depth to bedrock or other unfavorable material, permeability, ease of establishing vegetation, and resistance to water erosion, soil slipping, and piping.

*Grassed waterways* are constructed to channel runoff at nonerosive velocities to outlets. Features that affect the use of soils for waterways are slope, permeability, erodibility, and suitability for permanent vegetation.

### Construction Materials

The suitability of each soil as a source of road fill, sand, gravel, and topsoil is indicated in table 10 by ratings of good, fair, or poor. The texture, thickness, and organic-matter content of each soil horizon are important factors in rating soils for use as construction materials. Each soil is evaluated to the depth observed, generally about 6 feet, and is described as the survey is made.

*Road fill* is soil material used in embankments for roads. The ratings reflect the ease of excavating and working the material and the expected performance of the material after it has been compacted and adequately drained. The performance of soil after it is stabilized with lime or cement is not considered in the ratings, but information about soil properties that determine such performance is given in the descriptions of soil series.

The ratings apply to the soil profile between the A horizon and a depth of 5 to 6 feet. It is assumed that soil horizons will be mixed during excavation and spreading. Many soils have horizons of contrasting suitability within the profile. The estimated engineering properties in table 13 provide more specific information about the nature of each horizon that can help determine its suitability for road fill.

According to the Unified soil classification system, soils rated *good* have low shrink-swell potential, low potential frost action, and few cobbles and stones. They are at least moderately well drained and have slopes of 15 percent or less. Soils rated *fair* have a plasticity index of less than 15 and have other limiting features, such as high shrink-swell potential, high potential frost action, steep slopes, wetness, or many stones. If the thickness of suitable material is less than 3 feet, the entire soil is rated *poor*, regardless of the quality of the suitable material.

*Sand and gravel* are used in great quantities in many kinds of construction. The ratings in table 10 provide guidance as to where to look for probable sources and are based on the probability that soils in a given area contain sizable quantities of sand or gravel. A soil rated *good* or *fair* has a layer of suitable material at least 3 feet thick, the top of which is within a depth of 6 feet. Coarse fragments of soft bedrock material, such as shale and siltstone, are not considered to be sand and gravel. Fine-grained soils are not suitable sources of sand and gravel.

The ratings do not take into account depth to the water table or other factors that affect excavation of the material. Descriptions of grain size, kinds of minerals, reaction, and stratification are given in the soil series descriptions and in table 14.

*Topsoil* is used in areas where vegetation is to be established and maintained. Suitability is affected mainly by the ease of working and spreading the soil material in preparing a seedbed and by the ability of the soil material to sustain the growth of plants. Also considered is the damage that would result to the area from which the topsoil is taken.

Soils rated *good* have at least 16 inches of friable loamy material at their surface. They are free of stones, are low in content of gravel and other coarse fragments, and have gentle slopes. They are low in soluble salts, which can limit plant growth. They are naturally fertile or respond well to fertilization. They are not so wet that excavation is difficult during most of the year.

Soils rated *fair* are loose sandy or firm loamy or clayey soils in which the suitable material is only 8 to 16 inches thick or soils that have appreciable amounts of gravel, stones, or soluble salt.

Soils rated *poor* are very sandy soils, very firm clayey soils, soils with suitable layers less than 8 inches thick, soils having large amounts of gravel, stones or soluble salt, steep soils, and poorly drained soils.

Although a rating of *good* is not based entirely on high content of organic matter a surface horizon is much preferred for topsoil because of its organic-matter content. This horizon is designated as A1 or Ap in the soil series descriptions. The absorption and retention of moisture and nutrients for plant growth are greatly increased by organic matter. Consequently, careful preservation and use of material from these horizons are desirable.

## Recreation

By GEORGE YEATES, soil conservationist, Soil Conservation Service.

The soils of the survey area are rated in table 11 according to limitations that affect their suitability for camp areas, picnic areas, playgrounds, and paths and trails. The ratings are based on such restrictive soil features as flooding, wetness, slope, and texture of the surface layer. Not considered in these ratings, but important in evaluating a site, are location and accessibility of the area, size and shape of the area and its scenic quality, the ability of the soil to support vegetation, access to water, potential water impoundment sites available, and either access to public sewerlines or capacity of the soil to absorb septic tank effluent. Soils subject to flooding are limited, in varying degree, for recreational use by the duration of flooding and the season when it occurs. Onsite assessment of height, duration, and frequency of flooding is essential in planning recreational facilities.

In table 11 the limitations of soils are rated as slight, moderate, or severe. *Slight* means that the soil properties are generally favorable and that the limitations are minor and easily overcome. *Moderate* means that the limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 11 can be supplemented by additional information in other parts of this survey. Especially helpful are interpretations for septic tank absorption fields, given in table 8, and interpretations for dwellings without basements and for local roads and streets, given in table 7.

*Camp areas* require such site preparation as shaping and leveling tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils for this use have mild slopes and are not wet nor subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing camping sites.

*Picnic areas* are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for use as picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that will increase the cost of shaping sites or of building access roads and parking areas.

*Playgrounds* require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones or boulders, is firm after rains, and is not dusty when dry. If shaping is required to obtain a uniform grade, the depth of the soil over rock should be sufficient to allow necessary grading.

The design and layout of *paths and trails* for walking, horseback riding, and bicycling should require little or no cutting and filling. The best soils for this use are those that are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once during the period of use. They should have moderate slopes and have few or no stones or boulders on the surface.

## Wildlife

By EDWARD G. SULLIVAN, biologist, Soil Conservation Service.

Of all the factors that affect wildlife populations, the way man uses the land is the most important. Regardless of how well suited a soil may be for producing wildlife habitat, if the present land use eliminates the plant associations that soil can produce, the animals will not be there. For this reason, the kinds and numbers of wild animals in Webster County have varied over all the years since the area was settled.

Before Webster County was settled, the total area was predominantly forest. Hardwoods of many species were the dominant vegetation. Animals adapted to forests were abundant. Some of these were squirrels, deer, turkeys, bobcats, wolves, eagles, and many kinds of birds, including the now extinct passenger pigeon.

As this area was settled, logging and land clearing pushed the woodland animals farther back into remote areas. In their place came animals adapted to open land. Clearing fields, logging, burning, and other soil disturbances created vegetative patterns which met the needs of bobwhite quail, rabbits, doves, many types of ground and brush inhabiting songbirds, rodents, and reptiles.

These conditions were responsible for some of the highest bobwhite quail populations anywhere in the country. As this trend continued, the number of forest animals further declined. Wolves, panthers, deer, and turkeys disappeared. Agricultural and industrial demands and methods continued to change. After World War II, reforestation and wildlife management efforts began. With restocking and management, deer and turkeys have been restored. More intensive farming methods have caused some decline in the number of farm and openland wild animals. Kinds and numbers of wild animals will continue to change according to changes in methods and demands on the land.

### Wildlife Habitat

Soils directly affect the kind and amount of vegetation that is available to wildlife as food and cover, and they affect the development of water impoundments. The kind and abundance of wildlife that populate an area depend largely on the amount and distribution of food, cover, and water. If any one of these elements is missing, inadequate, or inaccessible, wildlife will either be scarce or will not inhabit the area.

If the soils have the potential, wildlife habitat can be created or improved by planting appropriate vegetation, by properly managing the existing plant cover, and by fostering the natural establishment of desirable plants.

In table 12, the soils in the survey area are rated according to their potential to support the main kinds of wildlife habitat in the area. This information can be used in—

1. Planning the use of parks, wildlife refuges, nature study areas, and other developments for wildlife.
2. Selecting soils that are suitable for creating, improving, or maintaining specific elements of wildlife habitat.
3. Determining the intensity of management needed for each element of the habitat.
4. Determining areas that are suitable for acquisition to manage for wildlife.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* means that the element of wildlife habitat or the kind of habitat is easily created, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected if the soil is used for the designated purpose. A rating of *fair* means that the element of wildlife habitat or kind of habitat can be created, improved, or maintained in most places. Moderate intensity of management and fairly

frequent attention are required for satisfactory results. A rating of *poor* means that limitations are severe for the designated element or kind of wildlife habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and requires intensive effort. A rating of *very poor* means that restrictions for the element of wildlife habitat or kind of wildlife are very severe, and that unsatisfactory results can be expected. Wildlife habitat is impractical or even impossible to create, improve, or maintain on soils having such a rating.

The elements of wildlife habitat are briefly described in the following paragraphs.

*Grain and seed crops* are seed-producing annuals used by wildlife. Examples are corn, sorghum, wheat, oats, millet, cowpeas, soybeans, and sunflowers. The major soil properties that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations.

*Grasses and legumes* are domestic perennial grasses and herbaceous legumes that are planted for wildlife food and cover. Examples are fescue, lovegrass, bahiagrass, clover, alfalfa, and crownvetch. Major soil properties that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations.

*Wild herbaceous plants* are native or naturally established herbaceous grasses and forbs, including weeds, that provide food and cover for wildlife. Examples are bluestem, indiangrass, goldenrod, beggarweed, pokeweed, partridgepea, wheatgrass, fescue, and grama. Major soil properties that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations.

*Hardwood trees* and the associated woody understory provide cover for wildlife and produce nuts or other fruit, buds, catkins, twigs, bark, or foliage that wildlife eat. Examples of native plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, persimmon, sassafras, sumac, hickory, hazelnut, black walnut, blackberry, grape, blackhaw, blueberry, bayberry, and briers. Examples of fruit-producing shrubs that are commercially available and suitable for planting on soils rated good are Russian-olive, autumn-olive, and crabapple. Major soil properties that affect growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness.

*Coniferous plants* are cone-bearing trees, shrubs, or ground cover plants that furnish habitat or supply food in the form of browse, seeds, or fruitlike cones. Examples are pine, cedar, and juniper. Major soil properties that affect the growth of coniferous plants are depth of the root zone, available water capacity, and wetness.

*Wetland plants* are annual and perennial wild herbaceous plants that grow on moist or wet sites, exclusive of submerged or floating aquatics. They produce food or cover for wildlife that use wetland as habitat. Examples of wetland plants are smartweed, wild millet, rushes, sedges, reeds, wildrice, saltgrass, cordgrass, and cattail. Major soil properties affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness.

*Shallow water areas* are bodies of surface water that have an average depth of less than 5 feet and are useful to wildlife. They can be naturally wet areas, or they can be created by dams or levees or by water-control devices in marshes or streams. Examples are muskrat marshes, waterfowl feeding areas, wildlife watering developments, beaver ponds, and other wildlife ponds. Major soil properties affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. The availability of a dependable water supply is important if water areas are to be developed.

The kinds of wildlife habitat are briefly described in the following paragraphs.

*Openland habitat* consists of croplands, pastures, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The kinds of wildlife attracted to these areas include bobwhite quail, meadowlark, field sparrow, killdeer, cottontail rabbit, red fox, and woodchuck.

*Woodland habitat* consists of hardwoods or conifers or a mixture of both, and associated grasses, legumes, and wild herbaceous plants. Examples of wildlife attracted to this habitat are wild turkey, woodcock, thrushes, woodpeckers, tree squirrels, grey fox, raccoon, and deer.

*Wetland habitat* consists of water-tolerant plants in open, marshy, or swampy shallow water areas. Examples of wildlife attracted to this habitat are ducks, geese, herons, shore birds, rails, kingfishers, muskrat, mink, and beaver.

## Soil Properties

Extensive data about soil properties collected during the soil survey are summarized on the following pages. The two main sources of these data are the many thousands of soil borings made during the course of the survey and the laboratory analyses of samples selected from representative soil profiles in the field.

When he makes soil borings during field mapping, the soil scientist can identify several important soil properties. He notes the seasonal soil moisture condition, or the presence of free water and its depth in the profile. For each horizon, he notes the thickness of the soil and its color; the texture, or the amount of clay, silt, sand, and gravel or other coarse fragments; the structure, or natural pattern of cracks and pores in the undisturbed soil; and the consistence of soil in place under the existing soil

moisture conditions. He records the root depth of plants, determines soil pH or reaction, and identifies any free carbonates.

Samples of soil material are analyzed in the laboratory to verify the field estimates of soil properties and to characterize key soils, especially properties that cannot be estimated accurately by field observation. Laboratory analyses are not conducted for all soil series in the survey area, but laboratory data for many of the soil series are available from nearby areas.

Based on summaries of available field and laboratory data, and listed in tables in this section, are estimated ranges in engineering properties and classifications and in physical and chemical properties for each major horizon of each soil in the survey area. Also, pertinent soil and water features, engineering test data, and data obtained from laboratory analyses, both physical and chemical, are presented.

## Engineering Properties

Table 13 gives estimates of engineering properties and classifications for the major horizons of each soil in the survey area. These estimates are presented as ranges in values most likely to exist in areas where the soil is mapped.

Most soils have, within the upper 5 or 6 feet, horizons of contrasting properties. Information is presented for each of these contrasting horizons. Depth to the upper and lower boundaries of each horizon in a typical profile of each soil is indicated. More information about the range in depth and in properties of each horizon is given for each soil series in "Soil Series and Morphology."

Texture is described in table 13 in standard terms used by the United States Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains gravel or other particles coarser than sand, an appropriate modifier is added, for example, "gravelly loam." Other texture terms used by USDA are defined in the Glossary.

The two systems commonly used in classifying soils for engineering use are the Unified Soil Classification System (USCS) (*2*) and the American Association of State Highway and Transportation Officials Soil Classification System (AASHTO) (*1*, *4*). In table 13 soils in the survey area are classified according to both systems.

The USCS system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter, plasticity index, liquid limit, and organic matter content. Soils are grouped into 15 classes—eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes have a dual classification symbol, for example CL-ML.

The AASHTO system classifies soils according to those properties that affect their use in highway construction and maintenance. In this system a mineral soil is classified as one of seven basic groups ranging from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines. At the other extreme, in group A-7, are fine-grained soils. Highly organic soils are classified as A-8 on the basis of visual inspection.

When laboratory data are available, the A-1, A-2, and A-7 groups are further classified as follows: A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, and A-7-6. As an additional refinement, the desirability of soils as subgrade material can be indicated by a group index number. These numbers range from 0 for the best subgrade material to 20 or more for the poorest. The AASHTO classification for soils tested in the survey area, with group index numbers in parentheses, is given in table 18. The estimated classification, without group index numbers, is given in table 13. Also in table 13 the percentage, by weight, of cobbles or the rock fragments more than 3 inches in diameter are estimated for each major horizon. These estimates are determined largely by observing volume percentage in the field and then converting it, by formula, to weight percentage.

Percentage of the soil material less than 3 inches in diameter that passes each of four standard sieves is estimated for each major horizon. The estimates are based on tests of soils that were sampled in the survey area and in nearby areas and on field estimates from many borings made during the survey.

*Liquid limit and plasticity index* indicate the effect of water on the strength and consistency of soil. These indexes are used in both the USCS and the AASHTO soil classification systems. They are also used as indicators in making general predictions of soil behavior.

Range in liquid limit and plasticity index are estimated on the basis of test data from the survey area or from nearby areas and on observations of the many soil borings made during the survey.

## Physical and Chemical Properties

Table 14 shows estimated values for several soil characteristics and features that affect behavior of soils in engineering uses. These estimates are given for each major horizon, at the depths indicated, in the representative profile of each soil. The estimates are based on field observations and on test data for these and similar soils.

*Permeability* is estimated on the basis of known relationships among the soil characteristics observed in the field—particularly soil structure, porosity, and gradation or texture—that influence the downward movement of water in the soil. The estimates are for water movement in a vertical direction when the soil is saturated. Not con-

sidered in the estimates is lateral seepage or such transient soil features as plowpans and surface crusts. Permeability of the soil is an important factor to be considered in the planning and design of drainage systems, in evaluating the potential of soils for septic tank systems and other waste disposal systems, and in many other aspects of land use and management.

*Available water capacity* is rated on the basis of soil characteristics that influence the ability of the soil to hold water and make it available to plants. Important characteristics are content of organic matter, soil texture, and soil structure. Shallow-rooted plants are not likely to use the available water from the deeper soil horizons. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design of irrigation systems.

*Soil reaction* is expressed as range in pH values. The range in pH of each major horizon is based on many field checks. For many soils, the values have been verified by laboratory analyses. Soil reaction is important in selecting the crops and ornamental or other plants to be grown, in evaluating soil amendments for fertility and stabilization, and in evaluating the corrosivity of soils.

*Shrink-swell potential* depends mainly on the amount and kind of clay in the soil. Laboratory measurements of the swelling of undisturbed clods were made for many soils. For others it was estimated on the basis of the kind of clay and on measurements of similar soils. Size of imposed loadings and the magnitude of changes in soil moisture content are also important factors that influence the swelling of soils. Shrinking and swelling of some soils can cause damage to building foundations, basement walls, roads, and other structures unless special designs are used. A *high* shrink-swell potential indicates that special design and added expense may be required if the planned use of the soil will not tolerate large volume changes.

*Risk of corrosion* pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to soil moisture, particle-size distribution, total acidity, and electrical conductivity of the soil material. The rating of soils for corrosivity to concrete is based mainly on the sulfate content, soil texture, and acidity. Protective measures for steel or more resistant concrete help to avoid or minimize damage resulting from the corrosion. Installations of steel that intersect soil boundaries or soil horizons are more susceptible to corrosion than installations entirely within one kind of soil or within one soil horizon.

*Erosion factors* are used to predict the amount of erosion that will result from specific kinds of land treatment. The soil erodibility factor (K) is a measure of the susceptibility of the soil to erosion by water. Soils having the highest K values are the most erodible. The soil-loss tolerance factor (T) is the maximum rate of soil erosion, whether from rainfall or wind, that may occur without reducing crop production or environmental quality.

## Soil and Water Features

Features that relate to runoff or infiltration of water, to flooding, and to grading and excavation are indicated in table 15. This information is helpful in planning land uses and engineering projects that are likely to be affected by the amount of runoff from watersheds, by flooding and a seasonal high water table, or by the presence of bedrock in the upper 5 or 6 feet of the soil.

*Hydrologic groups* are used to estimate runoff after rainfall. Soil properties that influence the minimum rate of infiltration into the bare soil after prolonged wetting are depth to a water table, water intake rate and permeability, and depth to layers of slowly or very slowly permeable soil.

*Flooding* is rated in general terms that describe the frequency, duration, and period of the year when flooding is most likely. The ratings are based on evidences in the soil profile of the effects of flooding, namely thin strata of gravel, sand, silt, or, in places, clay deposited by floodwater; irregular decrease in organic-matter content with increasing depth; absence of distinctive soil horizons that form in soils of the area that are not subject to flooding; local information about floodwater heights and the extent of flooding; and local knowledge that relates the unique landscape position of each soil to historic floods. Most soils in low positions on the landscape where flooding is likely to occur are classified as fluvents at the suborder level or as fluventic subgroups. See the section "Soil Series and Morphology."

The generalized description of flood hazards is of value in land use planning and provides a valid basis for land use restrictions. The soil data are less specific, however, than those provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

*A seasonal high water table* is the highest level of a saturated zone more than 6 inches thick in soils for a continuous period of more than 2 weeks during most years. The depth to a seasonal high water table applies to undrained soils. Estimates are based mainly on the relationship between grayish colors or mottles in the soil and the depth to free water observed during the course of the soil survey. Indicated are the depth to the seasonal high water table; the kind of water table, whether perched, artesian, or the upper part of the ground water table; and the months of the year that the high water commonly is present. Only those saturated zones above a depth of 5 or 6 feet are indicated.

Information about the seasonal high water table helps in assessing the need for specially designed foundations, the need for specific kinds of drainage systems, and the need for footing drains to insure dry basements. Such information is also needed to decide whether or not to construct basements and to determine how septic tank absorption fields and other underground installations will function. Also, a seasonal high water table affects ease of excavation.

*Depth to bedrock* is shown for all soils that are underlain by bedrock at depths of 5 to 6 feet or less. For many soils, limited range in depth to bedrock is a part of the definition of the soil series. The depths shown are based on measurements made in many soil borings and other observations during the soil mapping. The kind of bedrock and its hardness as related to ease of excavation are also shown. Rippable bedrock can be excavated with a single-tooth ripping attachment on a 200 horsepower tractor, but hard bedrock generally requires blasting.

## Chemical Analyses of Soils

By V. E. Nash, agronomist, Department of Agronomy, Mississippi Agricultural and Forestry Experiment Station, Mississippi State University, Mississippi.

The surfaces of clay and organic particles in soils are negatively charged. These charges are neutralized by relatively weak bonded cations, called exchangeable cations. They are called exchangeable cations because of the ease with which they may be replaced by other cations in the soil solution. Cation exchange is the name given to this process of replacing one cation on the clay or organic matter surface by another cation. It is sometimes called the second most important process in nature, being surpassed only by photosynthesis. The tremendous significance of this process can be appreciated if one realizes that the exchange surfaces hold nutrient cations in a form available to plants, yet, retard the loss of these nutrients by leaching.

The quantity of cations held in the exchangeable form is called the cation exchange capacity (CEC). The cation exchange capacity may be determined directly by measuring the maximum adsorption of a test cation or by summation of the individual exchangeable cations occurring naturally in the soil. The latter method was used to obtain the data in this report. The content of extractable cations and the CEC are expressed in milliequivalents (meq.) per 100 grams of ovendry soil. It is often desirable to convert meq./100g of the different cations to the more practical unit of pounds per acre plow layer (6-2/3 inches deep). For this purpose the following conversions may be helpful:

meq. calcium (Ca)/100g x 400 = pounds per acre of Ca
meq. magnesium (Mg)/100g x 240 = pounds per acre of Mg
meq. potassium (K)/100g x 780 = pounds per acre of K
meq. sodium (Na)/100 x 460 = pounds per acre of Na
meq. hydrogen (H)/100g x 20 = pounds per acre of H
meq. aluminum (Al)/100g x 180 = pounds per acre of Al

It is also useful to remember that 1 meq./100g of extractable acidity (H + Al) requires 1,000 pounds calcium carbonate lime per acre to neutralize it.

The soil analyses reported in table 16 were made in the Soil Genesis and Morphology Laboratory of the Mississippi Agricultural and Forestry Experiment Station. The procedures used were essentially like those given in the Soil Survey Investigation Report No. 1 (SSIR 1) (*10*).

Soil samples were collected from open pits by the soil scientist. Preparation of the samples for analyses at the laboratory consisted of air drying, grinding, and screening through a No. 10 sieve.

The exchangeable cations, calcium, magnesium, potassium, and sodium, were extracted by neutral, normal Ammonium Acetate (5Al) of SSRI 1. Calcium and magnesium in the extract were determined with a Perkin-Elmer atomic absorption apparatus using Strontium Chloride to suppress interference of Al, Si, and P. Potassium and sodium were analyzed by flame photometry using a Beckman flame spectrophotometer. Extractable acidity (H + Al) was extracted with barium chloride-triethanolamine buffered to pH 8.2.

The percentage base saturation was calculated by dividing the sum of the bases (Ca, Mg, Na, and K) by the sum of the cations and multiplying by 100. The sum of the cations include in addition to the bases the extractable acidity (H + Al).

Soil pH was determined potentiometrically with a Coleman pH meter using a 1:1 soil:water ratio.

The cation exchange capacity is not only a measure of the ability of a soil to hold nutrient cations in an available form, but also gives clues as to the type of clay present. For example, montmorillonite has a CEC of 80-120 meq./100g and is the only high CEC mineral present in several of the soils. It is notorious for its high shrink-swell potential. If one assumes that most of the CEC is in the clay fraction, it is apparent that the CEC of the clay in the Wilcox soils is 60-70 meq./100g. This suggests a considerable proportion of the clay fraction is montmorillonite in the clay. This soil was formed from thick beds of acid heavy clay materials over shale of the Coastal Plain. Similar soils in adjacent Oktibbeha County were shown by x-ray analyses to contain about 50 percent montmorillonite. The high shrink-swell potential of these soils also suggests the presence of montmorillonite. The other soils reported have low CEC values as would be expected from the low percentage of clay. Also, similar soils in adjacent counties have been found to be low in montmorillonite.

Calcium is the dominant basic exchangeable cation in these soils, particularly the deeper horizons of soils like Falkner, Tippah, Urbo, and Wilcox. The high content of calcium in the Ap horizons of several soils is, no doubt, the result of liming. Magnesium saturation of these soils is in the range of 5-10 percent, which is adequate for balanced plant nutrition. The parent material, particularly the Porters Creek clay, releases magnesium to the exchange complex. Many soils of this area have Ca/Mg ratio less than 1. In this highly leached acid soil the calcium minerals have been removed and magnesium is being released from the clay minerals. Exchangeable potassium is low, usually less than 0.2 meq./100g or 156 pounds per acre where no fertilizer has been applied.

The soils analyzed from Webster County are all acid as shown by the low pH, high extractable acidity, and low base saturation. Liming has raised base saturation and

pH in surface horizons of the Ariel, Falkner, Urbo, and Wilcox soils. The Falkner, Tippah, and Wilcox series have base saturations greater than 35 percent in the subsoil. The high acidity of most of these soils is another indication of high weathering intensity.

The Comprehensive Soil Classification System adopted by the National Cooperative Soil Survey makes use of chemical soil properties as differentiating criteria in some categories of the system. The Alfisol and Ultisol orders, which are classes in the highest category in the system, are separated on the basis of percentage base saturation, deep in the subsoil. Argillic horizons of the Ultisols have base saturations of less than 35 percent at a designated depth below 4 feet, whereas the Alfisols have values greater than 35 percent. In the soils reported here none have a percent base saturation low enough to be classed as an Ultisol. The Wilcox with 40 percent base saturation is in the Alfisols. The degree of weathering is inversely related to base saturation, since this is a measure of the extent of the replacement of bases by hydrogen during the leaching process.

## Particle-Size Analyses

The particle-size analyses of these soils were obtained using the hydrometer method of Day (*3*). Forty grams of soil were dispersed in a 0.5 percent Calgon solution sodium phosphate by mixing 5 minutes in a milk shaker. The dispersed soil was transferred to a sedimentation cylinder, made to 1,000 milliliters and equilibrated overnight in a 30 degrees C. water bath. The suspension was then mixed and allowed to settle. Hydrometer readings were taken at predetermined times to determine the clay content. The sand was separated on a 325 mesh sieve, dried, and weighed. All results, shown in table 17, are expressed on the basis of 110 degrees C. ovendry weight.

The physical properties of soils, such as water infiltration and conduction, shrink-swell potential, crusting, ease of tillage, consistence, and water-holding capacity, are closely related to soil texture (i.e., the percentage of sand, silt, and clay).

The Wilcox soil is high in the expansible montmorillonite clay. This causes shrinking and swelling during drying and wetting cycles and makes the soil very unstable as foundations for buildings and roads. Cracks develop during dry weather and sometimes damage plant roots. Water infiltration is rapid until the cracks swell closed, and then infiltration and hydraulic conductivity are very slow.

The Ariel, Falkner, Oaklimeter, Prentiss, and Tippah soils have a high silt content, which may result in adverse physical conditions. Often these soils pack excessively. A surface crust formed by raindrops may result in poor seedling germination and emergence. A plowpan also develops easily during tillage.

The surface horizons of the Wilcox and Urbo soils are silty clay loams. These soils have a narrow range of moisture conditions in which they can be worked without clodding. Tillage requires more power compared to the silty soils, and the moisture content at the time of tillage is more critical. These clayey soils have high water-holding and nutrient-holding capacities.

## Engineering Test Data

By Dr. V. E. Nash and Dr. H. B. Vanderford, agronomists, Department of Agronomy, Mississippi Agricultural and Forestry Experiment Station.

Table 18 contains engineering test data for the Falkner, Ozan, and Urbo series. These tests were made to help evaluate the soils for engineering purposes. The engineering classifications given are based on data obtained by mechanical analyses and by tests to determine liquid limits and plastic limits. The mechanical analyses were made by combined sieve and hydrometer methods.

Moisture-density (compaction) data are important in earthwork. If a soil material is compacted at successively higher moisture content, assuming that the compactive effort remains constant, the density of the compacted material increases until the optimum moisture content is reached. After that, density decreases with increase in moisture content. The highest dry density obtained in the compactive test is termed "maximum dry density." As a rule, maximum strength of earthwork is obtained if the soil is compacted to the maximum dry density.

Liquid limit and plasticity index indicate the effect of water on the strength and consistence of soil material. As the moisture content of a clayey soil is increased from a dry state, the material changes from a semisolid to a plastic state. If the moisture content is further increased, the material changes from a plastic to a liquid state. The plastic limit is the moisture content at which the soil material changes from the semisolid to plastic state; and the liquid limit, from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is plastic.

# Classification of the Soils

This section describes the soil series of the survey area, defines the current system of classifying soils, and classifies the soils of the area according to that system.

## Soil series and morphology

On the following pages each soil series in the survey area is described in detail. The series descriptions are arranged in alphabetic order by series name.

Some facts about the soil and its parent material are specified for each series. Then a pedon, a small three-dimensional area of soil typical of the soil series in the survey area, is described. The detailed descriptions of each soil horizon follow standards in the Soil Survey Manual (*5*). Unless otherwise noted, colors described are for moist soil.

Following the pedon description is the range of important characteristics of the soils mapped in this survey area. In the last paragraph soils of the specified series are compared with those of similar series and other series represented nearby. Phases, or mapping units, of each soil series are described in the section "Soil Maps for Detailed Planning."

### Ariel Series

The Ariel series consists of well drained soils formed in silty alluvium. Slopes are 0 to 2 percent.

Typical pedon of Ariel silt loam in an area of cropland approximately 6 miles northwest of Eupora, Mississippi; 30 yards south of gravel road, NW1/4NW1/4 sec. 22, T. 20 N., R. 9 E.:

Ap—0 to 6 inches, dark brown (10YR 4/3) silt loam; weak fine granular structure; very friable; many fine roots; medium acid; abrupt smooth boundary.

B21—6 to 16 inches, dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; common fine roots; common worm casts; medium acid; clear smooth boundary.

B22—16 to 30 inches, dark yellowish brown (10YR 4/4) silt loam, common fine faint brown mottles; weak medium subangular blocky structure; friable; common medium pores; few fine dark brown concretions; common worm casts; very strongly acid; clear smooth boundary.

A2b—30 to 37 inches, mottled dark yellowish brown (10YR 4/4) and pale brown (10YR 6/3) silt loam; weak medium subangular blocky structure; friable; common medium pores; few fine dark brown concretions; common worm casts; very strongly acid; clear wavy boundary.

B21b—37 to 45 inches, mottled dark yellowish brown (10YR 4/4), pale brown (10YR 6/3), and light brownish gray (10YR 6/2) silt loam; weak coarse prismatic parting to weak medium subangular blocky structure; friable; slightly compact; dark yellowish brown portion slightly brittle; few fine brown concretions; many fine pores; very strongly acid; clear wavy boundary.

B22b—45 to 58 inches, mottled yellowish brown (10YR 5/6), light brownish gray (10YR 6/2), gray (10YR 6/1), and dark yellowish brown (10YR 4/4) silt loam; weak coarse prismatic parting to weak medium subangular blocky structure; friable; slightly compact; dark yellowish brown portion slightly brittle; common fine black and brown concretions; very strongly acid; gradual wavy boundary.

B23bg—58 to 65 inches, gray (10YR 6/1) silt loam; many medium distinct yellowish brown (10YR 5/6) and pale brown (10YR 6/3) mottles; weak coarse prismatic parting to weak medium subangular blocky structure; friable; slightly compact; yellowish brown portion slightly brittle; common fine and medium black and brown concretions; very strongly acid.

Reaction ranges from medium acid to very strongly acid, except for surface layers that have been limed. Color of the A horizon is dark grayish brown, dark brown, dark yellowish brown, or brown silt loam. The B21 and B22 horizons are dark brown, dark yellowish brown, brown, or yellowish brown. The A2b horizon is pale brown, grayish brown, or is mottled in shades of gray and brown. Texture is silt loam. Clay content ranges from 10 to 18 percent and sand content from 3 to 15 percent in the 10 to 40 inch control section. The B21b and B22b horizons are mottled in shades of brown and gray or have brownish matrix colors with few to many gray mottles. The B23bg horizon is gray with brown mottles or is mottled in shades of gray and brown. Texture of the B2b horizon is a silt loam or loam. Solum thickness exceeds 60 inches. Depth to the buried solum ranges from 20 to 40 inches.

The Ariel soils are associated with the Arkabutla, Cascilla, and Oaklimeter soils. The Ariel soils are better drained than the Arkabutla and Oaklimeter soils. Ariel soils have a less clayey B horizon than the Cascilla and Arkabutla soils.

### Arkabutla Series

The Arkabutla series consists of somewhat poorly drained soils formed in silty alluvium. Slopes are 0 to 2 percent.

Typical pedon of Arkabutla silt loam in an area of cropland approximately 0.5 mile south of Tomnolen, Mississippi; 63 yards east of gravel road, SW1/4SE1/4 sec. 28, T. 19 N., R. 9 E.:

Ap—0 to 6 inches, dark brown (10YR 4/3) silt loam, few fine distinct light brownish gray mottles; weak fine granular structure; many fine roots; very strongly acid; abrupt smooth boundary.

B21—6 to 10 inches, dark brown (10YR 4/3) silt loam with many medium distinct light brownish gray (10YR 6/2) and dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; common fine roots; common fine brown and black concretions; very strongly acid; clear smooth boundary.

B22—10 to 18 inches, mottled light brownish gray (10YR 6/2), brown (10YR 4/3), and dark brown (7.5YR 4/4) silty clay loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; many fine yellowish brown and black concretions; very strongly acid; clear smooth boundary.

B23g—18 to 31 inches, light brownish gray (10YR 6/2) silt loam with common medium distinct yellowish brown (10YR 5/4) and light olive brown (2.5Y 5/4) mottles; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; few fine yellowish brown concretions; very strongly acid; gradual smooth boundary.

B24g—31 to 42 inches, gray (10YR 6/1) silty clay loam with many medium distinct light olive brown (2.5Y 5/4) and dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; many medium black and yellowish brown concretions; very strongly acid; gradual smooth boundary.

B25g—42 to 60 inches, gray (10YR 6/1) silty clay loam with many medium distinct grayish brown (2.5Y 5/2), light olive brown (2.5Y 5/6), and dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; firm, slightly sticky, slightly plastic; few fine roots; many medium black and yellowish brown concretions; very strongly acid.

Reaction ranges from strongly acid to very strongly acid throughout the soil profile.

Color of the A horizon is dark grayish brown, very dark grayish brown, or dark brown. The B21 and B22 horizons are brown or dark brown silt loam or silty clay loam with few to many mottles in shades of gray, brown, or yellow. The matrix may be mottled in shades of gray, brown, and yellow. The Bg horizon has gray matrix color mottled in various shades of gray, brown, and yellow. Texture is silt loam or silty clay loam. Brown and black concretions range from few to many. The 10 to 40 inch control section is 20 to 32 percent clay and less than 15 percent sand greater than very fine.

Arkabutla soils are associated with Chenneby, Guyton, Oaklimeter, and Urbo soils. Chenneby soils do not have gray matrix colors in the B2 horizons at depths of less than 20 inches. Guyton soils are gray and are not so well drained as the Arkabutla soils. Oaklimeter soils have buried horizons and are less than 18 percent clay in the control section. Urbo soils are similar in drainage, but are more than 35 percent clay in the 10 to 40 inch control section.

### Bonn Series

The Bonn series consists of poorly drained soils formed in silty materials on low terraces. Slopes are 0 to 2 percent.

Typical pedon of Bonn silt loam in an area used for pasture approximately 3 1/2 miles east of Eupora, Mississippi; then south 1/2 mile off U.S. Highway No. 82 on

paved road, 165 yards west of road, SE1/4NW1/4 sec. 1, T. 19 N., R. 10 E.:

Ap—0 to 5 inches, light brownish gray (10YR 6/2) silt loam; many fine distinct dark brown and light gray mottles; weak fine granular and subangular blocky structure; friable; many fine roots; neutral; abrupt smooth boundary.

A21g—5 to 12 inches, gray (10YR 6/1) silt loam; common medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; many fine roots; dark brown silt loam occurs in cracks and between peds in varvedlike manner; strongly alkaline; gradual wavy boundary.

A22g and B21tg—12 to 20 inches, gray (10YR 6/1) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; about 48 percent light brownish gray (2.5Y 6/2) B material; weak coarse prismatic structure parts to weak medium subangular blocky structure; friable; A2g horizon occurs as tongues between remnants of B material and contains dark brown silt loam arranged in varvedlike manner; few fine roots; patchy clay films on faces of B bodies; strongly alkaline; clear irregular boundary.

B22tg—20 to 28 inches, light brownish gray (2.5Y 6/2) silt loam; many medium distinct light olive brown (2.5Y 5/4) mottles; weak coarse prismatic structure that parts to weak medium subangular blocky structure; friable; few fine roots; tongues of gray silt occur every 3 to 5 inches and are 1-1/2 to 3 inches wide; patchy clay films; many fine and medium black and brown concretions; strongly alkaline; gradual irregular boundary.

B23tg—28 to 46 inches, light brownish gray (2.5Y 6/2) silt loam; many medium distinct light olive brown (2.5Y 5/4) and yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parts to moderate medium subangular structure; firm; few fine roots through peds; interfingering and tongues of gray silt 1 to 2 inches wide that occur about every 8 inches; few patchy clay films; common fine black and brown concretions; few medium calcite concretions; strongly alkaline; gradual irregular boundary.

B3g—46 to 70 inches, mottled light brownish gray (2.5Y 6/2), light olive brown (2.5Y 5/6), and yellowish brown (10YR 5/6) silt loam; weak coarse prismatic structure that parts to weak medium subangular blocky structure; arranged in weak coarse prisms; firm; few fine roots; tongues of gray silt 1 to 2 inches wide that occur about every 8 inches; patchy clay films; few black and brown concretions; few fine calcite concretions; strongly alkaline.

Reaction ranges from medium acid to strongly alkaline in the A horizon and from neutral to strongly alkaline in the B horizon. Typically the soils become strongly alkaline within 16 inches of the soil surface. Exchangeable sodium saturation ranges from 15 to 50 percent throughout the B horizon.

The Ap or A2 horizon is light brownish gray, dark grayish brown, gray, light gray, or grayish brown silt loam. Texture of the Bt horizon is silt loam or silty clay loam; color range is like that of the Ap horizon. Mottles in shades of brown and gray commonly occur. Tongues of silt loam A2 material 1 to 3 inches wide extend into the lower Bt. A few accumulations of dark gray to gray clay generally occur as discontinuous varvedlike horizontal bands within tongues of A2 or as coatings on the tops or sides of columns and prisms and in pores. The biscuit-shaped caps on the tops of columns are weakly expressed or may be absent. Black and brown concretions occur throughout the solum, and calcite nodules occur within the Bt horizon of some pedons.

Bonn soils are associated with Arkabutla, Guyton, Oaklimeter, and Verdun soils. The Bonn soils are grayer and are not so well drained as the Arkabutla, Oaklimeter, and Verdun soils. The Bonn soils are similar to the Guyton soils in color and drainage, but have high exchangeable sodium saturation.

## Bruno Series

The Bruno series consists of excessively drained soils formed in sandy alluvium and thin strata of finer material. Bruno soils are on flood plains. Slopes are 0 to 2 percent.

Typical pedon of Bruno sandy loam in an area used for pasture approximately 3 1/2 miles north of Tomnolen, Mississippi; 220 yards south of paved road, NW1/4NE1/4 sec. 7, T. 19 N., R. 9 E.:

Ap1—0 to 3 inches, dark brown (10YR 3/3) sandy loam with many medium distinct yellowish brown (10YR 5/4) mottles; weak fine granular structure; very friable; many fine roots; medium acid; abrupt smooth boundary.

Ap2—3 to 7 inches, yellowish brown (10YR 5/4) sandy loam; weak fine granular structure; very friable; common fine roots; medium acid; abrupt smooth boundary.

C1—7 to 21 inches, strong brown (7.5YR 5/6) loamy sand with thin layers of yellowish red (5YR 4/8) silty material; structureless; very friable to loose; few thin horizontal bedding planes; common fine roots; strongly acid; clear smooth boundary.

C2—21 to 31 inches, yellowish red (5YR 4/8) sandy loam with brown (10YR 5/3) pockets of silty material; structureless; very friable; horizontal bedding planes; few fine roots; strongly acid; gradual smooth boundary.

C3—31 to 43 inches, yellowish red (5YR 4/8) loamy sand with many coarse brownish yellow (10YR 6/6) mottles; single grained; loose; few fine roots; neutral; gradual smooth boundary.

C4—43 to 62 inches, strong brown (7.5YR 5/6) sand; single grained; loose; few fine roots; neutral.

Reaction ranges from strongly acid to neutral.

The A horizon is dark brown, brown, dark grayish brown, and yellowish brown. The C horizon is dark brown, strong brown, yellowish brown, or yellowish red. Some pedons have reddish yellow, strong brown, brown, pale brown, or grayish brown mottles. These soils have a C horizon that has slightly redder colors than is defined as the range for the series, but this difference does not alter their usefulness and behavior. The 10 to 40 inch control section is dominantly sand or loamy sand with thin strata of loamy and silty material. Thin bedding planes are evident in most pedons.

Bruno soils are associated with Cascilla, Jena, and Oaklimeter soils. Bruno soils are better drained than Jena soils, which lack bedding planes. Bruno soils have a higher sand content and are better drained than Cascilla and Oaklimeter soils.

## Bude Series

The Bude series consists of somewhat poorly drained soils with a thin mantle of silty material over loamy material. Bude soils have a fragipan and are on uplands and terraces. Slopes are 0 to 2 percent.

Typical pedon of Bude silt loam, 0 to 2 percent slopes, in an area used for pasture approximately 2 miles southwest of Eupora, Mississippi; 39 yards south of C & G railroad, NE1/4NE1/4 sec. 13, T. 19 N., R. 9 E.:

Ap—0 to 6 inches, dark yellowish brown (10YR 4/4) silt loam with few fine faint pale brown mottles; weak fine and medium granular structure; very friable; many fine roots; few fine black and brown concretions; few yellowish brown root stains; medium acid; abrupt smooth boundary.

B21—6 to 11 inches, yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; many fine roots; few fine and medium black and brown concretions; strongly acid; clear smooth boundary.

B22—11 to 16 inches, yellowish brown (10YR 5/4) silt loam with many medium distinct light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable; common fine roots; common medium black and brown concretions; strongly acid; clear wavy boundary.

A'2 and B'x1—16 to 21 inches, mottled pale brown (10YR 6/3), light gray (10YR 7/1), and yellowish brown (10YR 5/6) silt loam; weak fine subangular and granular structure; friable; slightly brittle; yellowish

brown portion is small remnants of the B horizon; few fine roots; few fine yellowish brown concretions; medium acid; abrupt irregular boundary.

B'x2—21 to 32 inches, mottled yellowish brown (10YR 5/4) pale brown (10YR 6/3), and light gray (10YR 7/1) silt loam; moderate coarse prismatic structure that parts to moderate medium subangular blocky structure; firm; compact and brittle; thick continuous clay films on ped faces and prisms; tongues of gray silty material between prisms; few fine roots in cracks; many meidum black concretions; strongly acid; gradual wavy boundary.

IIB'x3—32 to 43 inches, light olive brown (2.5Y 5/4) silt loam (containing appreciable sand) with many medium distinct dark yellowish brown (10YR 4/4) and common medium distinct gray (10YR 5/1) mottles; weak coarse prismatic structure parts to moderate angular and subangular blocky structure; firm; compact and brittle; clay films on ped faces and prisms; tongues of gray silty material between prisms; many black and brown concretions; few fine roots in cracks; strongly acid; gradual wavy boundary.

IIB'x4—43 to 57 inches, light gray (10YR 7/2) silt loam with many medium distinct yellowish brown (10YR 5/6) and few fine distinct strong brown (7.5YR 5/6) mottles; moderate coarse prismatic structure parting to moderate medium angular and subangular blocky structure; firm; compact and brittle; very hard; clay films on faces of peds and prisms; many black and brown concretions; tongue of gray silty material between prisms; medium acid; gradual wavy boundary.

IIB'x5—57 to 72 inches, mottled light yellowish brown (2.5Y 6/4), yellowish brown (10YR 5/6), and light gray (10YR 7/2) clay loam; moderate coarse prismatic structure parting to moderate medium angular and subangular structure; firm; compact and brittle; very hard; clay films on faces of peds and prisms; common medium black and brown concretions; strongly acid.

Solum thickness exceeds 60 inches. Depth to the fragipan ranges from 18 to 35 inches. The reaction is medium acid to very strongly acid.

Color of the Ap horizon is dark brown, brown, dark yellowish brown, or dark grayish brown. Color of the B2 horizon is yellowish brown, brown, dark yellowish brown, or strong brown silt loam or silty clay loam with few to many mottles of chroma 2 or less. The B2 horizon may be mottled in shades of yellow, gray, and brown. Between a depth of 10 inches and the top of the fragipan, clay content ranges from 18 to 30 percent, and sand content from 4 to 15 percent. The A'2 and B'x1 horizon is gray, pale brown, light grayish brown, or mottled pale brown, light gray, and yellowish brown. Texture of the A'2 is silt loam or loam, and the clay content is less than that of the B2 and B'x horizons. The B'x horizon is gray or light brownish gray, or is mottled in shades of yellow, brown, or gray. Texture is silt loam, silty clay loam, or clay loam. Below the B horizon of the upper sequence and to a depth of 48 inches, sand content is more than 15 percent. Black and brown concretions range from few to many in all horizons.

Bude soils are associated with Guyton and Providence soils. Bude soils are browner and better drained than Guyton soils, which lack a fragipan. Bude soils have gray mottles in the upper 16 inches and are not so well drained as Providence.

## Cascilla Series

The Cascilla series consists of well drained soils formed in silty alluvium. Slopes are 0 to 2 percent.

Typical pedon of Casilla silt loam in an area of cropland approximately 3 1/2 miles southwest of Mantee, Mississippi; approximately 350 yards south of highway, NW1/4SE1/4 sec. 2, T. 21 N., R. 11 E.:

Ap—0 to 9 inches, dark brown (10YR 4/3) silt loam; weak fine and medium granular structure; very friable; many fine roots; slightly acid; abrupt smooth boundary.

B1—9 to 13 inches, dark brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; few fine roots; few thin clay films in root and worm channels; few worm casts; very strongly acid; clear smooth boundary.

B21—13 to 26 inches, dark yellowish brown (10YR 4/4) silt loam; weak medium and coarse blocky structure; friable; few fine roots; few thin clay films on some peds and in pores; few worm casts; very strongly acid; clear smooth boundary.

B22—26 to 32 inches, dark brown (10YR 4/3) silt loam with common fine distinct light brownish gray and yellowish brown mottles; weak medium and coarse subangular blocky structure; friable; few fine roots; few thin clay films on some peds and in pores; few worm casts; very strongly acid; gradual smooth boundary.

B23—32 to 42 inches, dark brown (10YR 4/3) silt loam with many medium distinct light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few thin clay films on some peds and in pores; few fine black and yellowish brown concretions; very strongly acid; gradual smooth boundary.

B24—42 to 60 inches, mottled light brownish gray (10YR 6/2), yellowish brown (10YR 5/6), and dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; few thin clay films on some peds and in cracks; common medium black and yellowish brown concretions; very strongly acid.

The soil ranges from strongly acid to very strongly acid, except where it has been limed. Color of the A horizon is dark brown, dark yellowish brown, brown, and yellowish brown. Color of the B1 and B21 horizons is dark yellowish brown, yellowish brown, dark brown, or brown. The lower B horizon is similar in color, but may have chroma 2 mottles at depths greater than 24 inches, or may be mottled with gray. The B horizon is silt loam that is between 18 and 24 percent clay and less than 15 percent sand coarser than very fine sand.

Cascilla soils are associated with Arkabutla, Chenneby, and Jena soils. Cascilla soils are browner than Arkabutla soils, are better drained than Chenneby soils, and lack chroma 2 mottles or lower within 24 inches of surface. Jena soils are more than 15 percent sand coarser than very fine sand.

## Chenneby Series

The Chenneby series consists of somewhat poorly drained soils formed in silty alluvium. Chenneby soils are on flood plains. Slopes are 0 to 2 percent.

Typical pedon of Chenneby silt loam in an area of cropland approximately 3 miles south of Mantee, Mississippi; 30 yards west of gravel road, NW1/4NW1/4 sec. 13, T. 16 S., R. 2 E.:

Ap—0 to 7 inches, dark brown (10YR 4/3) silt loam; weak fine granular structure; friable; common fine roots; neutral; clear smooth boundary.

B1—7 to 14 inches, dark brown (7.5YR 4/4) silt loam; weak medium subangular blocky structure parting to weak fine and medium granular structure; friable; few fine roots; strongly acid; clear smooth boundary.

B21—14 to 20 inches, dark yellowish brown (10YR 4/4) silty clay loam with common fine distinct grayish brown mottles; weak medium subangular blocky structure; friable; few fine roots; very strongly acid; clear smooth boundary.

B22—20 to 38 inches, dark brown (7.5YR 4/4) silty clay loam; common medium distinct gray (10YR 5/1) mottles; weak medium subangular blocky structure; friable; few fine roots; many fine and medium black concretions; very strongly acid; gradual smooth boundary.

C—38 to 60 inches, mottled dark yellowish brown (10YR 4/4), gray (5Y 5/1), grayish brown (10YR 5/2), and light olive brown (2.5Y 5/6) silty clay loam; massive; firm; few fine roots; many fine and medium black concretions; very strongly acid.

Solum thickness is more than 60 inches. Reaction is strongly acid to very strongly acid, except in limed areas.

The Ap horizon is dark brown, dark grayish brown, or dark yellowish brown. The B1 horizon is brown or dark brown with few to many mottles in shades of gray or brown. The B21 and B22 horizons are dark yel-

lowish brown or dark brown with few to many mottles in shades of gray or brown. Some profiles are mottled in shades of gray and brown in the lower part of the B horizon. Texture is silt loam or silty clay loam. The C horizon is mottled in shades of gray and brown or has a gray matrix with few to many mottles in shades of gray and brown.

Chenneby soils are associated with Arkabutla, Cascilla, and Urbo soils. Chenneby soils are browner in the upper part of the B horizon than the Arkabutla soils. They are not as clayey in the B horizon as Urbo soils and do not have gray matrix colors at depths of less than 20 inches. Chenneby soils are not so well drained as the Cascilla soils and have gray mottles at depths of less than 24 inches.

## Falkner Series

The Falkner series consists of somewhat poorly drained upland soils formed in silty material over clayey material. Slopes are 0 to 5 percent.

Typical pedon of Falkner silt loam in an area of Falkner silt loam, 2 to 5 percent slopes, used for cropland and pasture approximately 4 miles southwest of Mantee, Mississippi; SE1/4SE1/4 sec. 15, T. 16 S., R. 2 E.:

Ap—0 to 6 inches, dark yellowish brown (10YR 4/4) silt loam with few medium faint yellowish brown (10YR 5/6) mottles; weak medium granular structure; friable; many fine roots; few fine dark concretions; medium acid; abrupt smooth boundary.

B21t—6 to 11 inches, yellowish brown (10YR 5/4) silt loam with common medium distinct light brownish gray (10YR 6/2) mottles; moderate fine and medium subangular blocky structure; friable; common fine roots; few patchy clay films; few fine black concretions; very strongly acid; clear smooth boundary.

B22t—11 to 21 inches, mottled yellowish brown (10YR 5/6), light brownish gray (10YR 6/2), and grayish brown (2.5Y 5/2) silty clay loam; moderate fine and medium subangular blocky structure; friable; few fine roots; few patchy clay films; few fine black and red concretions; very strongly acid; gradual smooth boundary.

B23t—21 to 33 inches, mottled gray (10YR 6/1), yellowish brown (10YR 5/6), and light olive brown (2.5Y 5/4) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; few patchy clay films; few fine black and red concretions; very strongly acid; gradual wavy boundary.

IIB24t—33 to 63 inches, gray (10YR 6/1) silty clay, many coarse distinct strong brown (7.5YR 5/6) and yellowish red (5YR 5/6) mottles; moderate medium subangular blocky structure; very firm, very plastic; clay flows or films on faces; few pressure faces; common fine black concretions; very strongly acid; gradual wavy boundary.

IIB25t—63 to 75 inches, gray (10YR 6/1) silty clay, many coarse distinct yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/4) mottles; weak medium angular and platy structure; firm, plastic; 15 percent shale fragments; patchy clay films; many common black and brown concretions; very strongly acid.

Solum thickness is more than 60 inches. Thickness of the silty upper part of the solum to the clayey horizon is 15 to 35 inches. Reaction is slightly acid to extremely acid.

The A horizon is dark grayish brown, dark yellowish brown, or brown silt loam. Some pedons have an A2 horizon. The B21t horizon is pale brown to yellowish brown. In some pedons this horizon contains gray mottles. The B22t horizon is either similar to the B21t horizon in color of the matrix and contains few to many gray mottles, or it is mottled gray, red, brown, or yellow. The Bt horizon ranges from silt loam to silty clay loam. The upper 20 inches of the B horizon averages 25 to 35 percent clay. The IIBt horizon has a gray matrix with few to many fine coarse mottles of yellow, brown, or red. Texture is silty clay loam, silty clay, or clay.

Falkner soils are associated with Longview, Tippah, and Wilcox soils. The Falkner soils lack the A'2 horizon and interfingering into the Bt horizon, which are characteristic of the Longview soils. Falkner soils have more clayey lower Bt horizons. Falkner soils are not so well drained as the Tippah soils and do not have a matrix strong brown or yellowish red upper Bt horizon. Falkner soils are not so clayey and red in the upper Bt horizon as the Wilcox soils.

## Guyton Series

The Guyton series consists of poorly drained soils formed in silty materials. Guyton soils are on flood plains and low terraces. Slopes are 0 to 2 percent.

Typical pedon of Guyton silt loam in an area of Guyton silt loam used for pasture, 0.3 mile north of Choctaw County and 1.7 miles west of Oktibbeha County, NE1/4SW1/4 sec. 2, T. 19 N., R. 11 E.:

Ap—0 to 6 inches, grayish brown (10YR 5/2) silt loam; many medium distinct dark brown (10YR 4/3) mottles; weak medium granular structure; many fine black and brown concretions; medium acid; abrupt smooth boundary.

A21g—6 to 14 inches, light brownish gray (10YR 6/2) silt loam with common medium distinct yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) mottles; weak medium granular and weak medium subangular blocky structure; friable; many fine and few medium roots; few fine black and brown concretions; strongly acid; clear wavy boundary.

A22g—14 to 21 inches, gray (10YR 6/1) silt loam with many fine and medium distinct strong brown (7.5YR 5/6) and yellowish brown (10YR 5/6) mottles; weak medium granular and weak medium subangular blocky structure; friable; common fine roots; few fine black and brown concretions; strongly acid; clear irregular boundary.

B21tg—21 to 28 inches, gray (10YR 5/1) silty clay loam with interior of peds mottled gray (10YR 5/1), strong brown (7.5YR 5/6), and light olive brown (2.5Y 5/4); weak medium prismatic structure parting to moderate medium subangular and angular blocky structure; firm; common fine roots; gray silt tongues 1/2 to 4 inches wide, 8 to 10 inches apart with few horizontal dark grayish brown silty clay lenses; continuous clay films; common medium dark yellowish brown concretions; very strongly acid; gradual irregular boundary.

B22tg—28 to 38 inches, gray (10YR 5/1) silty clay loam with ped interiors mottled gray (10YR 5/1), grayish brown (2.5Y 5/2), and light olive brown (2.5Y 5/6); weak coarse prismatic structure parting to moderate medium subangular blocky structure; firm; few fine roots; gray silt tongues 1/2 to 4 inches wide, 8 to 10 inches apart with horizontal dark grayish brown lenses; few dark grayish brown (10YR 4/2) silty clay loam lenses; few dark gray silty clay loam cups at base of tongues; continuous clay films; common medium dark brown and black concretions; very strongly acid; gradual irregular boundary.

B23tg—38 to 54 inches, grayish brown (10YR 5/2) silt loam with many medium distinct yellowish brown (10YR 5/6) and common fine faint dark brown mottles; weak coarse prismatic structure parting to weak medium subangular blocky structure; firm; few fine roots; gray silt tongues 2 to 4 inches wide, 8 to 10 inches apart; few dark gray clay cups at base of some tongues; horizontal dark grayish brown silty clay loam lenses; common patchy clay films; common medium black and brown concretions; very strongly acid; gradual wavy boundary.

B24tg—54 to 68 inches, gray (10YR 6/1) silt loam; many medium distinct strong brown (7.5YR 5/6) and yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to weak medium subangular blocky structure; firm; few fine roots; gray silt loam tongues 2 to 4 inches wide occurring 8 to 10 inches apart; few patchy clay films; few medium black and brown concretions; very strongly acid; gradual wavy boundary.

B25t—68 to 82 inches, gray (10YR 5/1) silt loam; common medium distinct yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) mottles; weak coarse prismatic structure parting to weak medium subangular blocky structure; firm; few fine roots; gray silt tongues 2 to 4 inches wide occurring 8 to 10 inches apart; few patchy clay films; few medium black and brown concretions; strongly acid.

Thickness of the solum ranges from 52 to more than 80 inches. Reaction ranges from medium acid to very strongly acid.

Color of the Ap horizon is brown, grayish brown, dark grayish brown, or light brownish gray. The A2 horizon is light brownish gray, grayish brown, or gray with few to many brown and yellow mottles. The B horizon is similar to the A2 horizon in color, and the texture is silt loam or silty clay loam.

Soils of the Guyton series have a slightly more clayey upper Bt horizon than is defined as the range for the series, but this difference does not alter their usefulness and behavior. Black, brown, or yellowish brown concretions range from few to many in all horizons.

Guyton soils are associated with Bude, Oaklimeter, and Ozan soils. The Guyton soils are gray and not so well drained as the Bude and Oaklimeter soils. Guyton soils are similar to the Ozan soils in color and drainage, but are less than 15 percent sand coarser than very fine sand in the control section.

## Jena Series

The Jena series consists of well drained soils that formed in loamy Coastal Plain alluvium. Jena soils are on flood plains. Slopes are 0 to 2 percent.

Typical pedon of Jena fine sandy loam in an area of cropland approximately 2 miles northeast of Savannah fire tower, NW1/4NE1/4 sec. 17, T. 21 N., R. 11 E.:

Ap—0 to 8 inches, dark brown (10YR 4/3) fine sandy loam; weak fine granular structure; very friable; neutral; abrupt smooth boundary.

B21—8 to 32 inches, yellowish brown (10YR 5/4) fine sandy loam; weak medium subangular blocky structure; very friable; strongly acid; gradual smooth boundary.

B22—32 to 40 inches, yellowish brown (10YR 5/6) fine sandy loam; weak medium subangular blocky structure; very friable; strongly acid; gradual smooth boundary.

C—40 to 60 inches, yellowish brown (10YR 5/4) fine sandy loam with common fine distinct strong brown mottles; structureless; very friable; strongly acid.

Reaction ranges from medium acid to very strongly acid, except for those surface layers that have been limed.

Color of the Ap horizon is brown, dark brown, and dark grayish brown. The B21 horizon is light yellowish brown, yellowish brown, brown, or strong brown. The B22 and C horizons are similar in color to the B21 horizon, but may have few to many mottles in shades of brown and gray. Texture of the B horizon is very fine sandy loam, fine sandy loam, or sandy loam. The 10 to 40 inch control section is less than 18 percent clay and more than 15 percent sand coarser than very fine sand. Texture of the C horizon is fine sandy loam, sandy loam, or loamy fine sand.

Jena soils are associated with Ariel and Cascilla soils. The Jena soils have a more sandy B horizon than that in the Ariel and Cascilla soils.

## Longview Series

The Longview series consists of somewhat poorly drained soils formed in silty material. Longview soils are on broad upland flats. Slopes are 0 to 2 percent.

Typical pedon of Longview silt loam, 0 to 2 percent slopes, described in a 20 acre area approximately 2 miles southwest of Hohenlinden, Mississippi; 15 yards north of gravel road and 15 yards east of field road, SW1/4NW1/4 sec. 6, T. 21 N., R. 11 E.:

Ap—0 to 7 inches, dark yellowish brown (10YR 4/4) silt loam; weak fine granular structure; friable; many fine roots; few fine black concretions; medium acid; abrupt wavy boundary.

B21t—7 to 11 inches, yellowish brown (10YR 5/6) silt loam with common fine faint light brownish gray mottles; weak fine and medium subangular blocky structure; friable; few fine roots; many fine pores; patchy clay films; common fine yellowish brown concretions; strongly acid; clear smooth boundary.

B22t—11 to 20 inches, light yellowish brown (10YR 6/4) silt loam; common medium distinct light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) mottles; weak fine and medium subangular blocky structure; friable; few fine roots; many fine pores; few very thin oriented clay films along pores; common fine yellowish brown concretions; strongly acid; gradual wavy boundary.

B23t and A'2—20 to 31 inches, mottled light olive brown (2.5Y 5/6), light yellowish brown (2.5Y 6/4), and light gray (10YR 7/1) silt loam; moderate medium prismatic structure parting to moderate medium subangular blocky structure; friable to firm; brown portion slightly brittle and compact; few fine roots; common fine yellowish brown and black concretions; common fine pores; few thin patchy clay films; gray silt coats on ped faces in pockets and on prism faces; strongly acid; gradual smooth boundary.

B24t—31 to 42 inches, gray (10YR 6/1) silty clay loam; many medium distinct strong brown (7.5YR 5/8) and light olive brown (2.5Y 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky structure; friable; slightly compact and brittle; patchy clay films; few fine black and brown concretions; gray silt coats on ped faces and prism faces; strongly acid; gradual smooth boundary.

B25t—42 to 60 inches, gray (10YR 6/1) silty clay loam; many fine and medium distinct strong brown (7.5YR 5/8) and light olive brown (2.5Y 5/4) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky structure; firm, plastic, sticky; clay films on faces of peds; gray silt coating on ped faces; few fine yellowish brown and black concretions; strongly acid.

Solum thickness is more than 60 inches. Reaction ranges from strongly acid to extremely acid, except for those surface layers that have been limed.

Color of the A horizon is dark grayish brown, dark yellowish brown, and brown. The B2t horizon is yellowish brown, light yellowish brown, or pale brown with few to many gray mottles. Texture of the upper Bt horizon is silt loam. A discontinuous A'2 horizon of light gray or light yellowish brown occurs as interfingering around Bt peds at depths of 18 to 24 inches. The lower Bt horizon is gray mottled with brownish mottles. Texture of the lower Bt horizons is silt loam or silty clay loam. Clay content of the upper 20 inches is 18 to 27 percent.

Longview soils are associated with Guyton and Providence soils. The Longview soils are not so gray in the upper part of the B horizon, and they are not so wet as the Guyton soils. The Providence soils have a fragipan.

## Maben Series

The Maben series consists of well drained soils that have stratified shaly clay and sandy material. Maben soils are on side slopes. Slopes range from 8 to 35 percent, but are dominantly 12 to 35 percent.

Typical pedon of Maben loam, 8 to 15 percent slopes, described in a 40 acre area of woodland approximately 1-1/2 miles south of Maben, SW1/4SE1/4 sec. 1, T. 19 N., R. 11 E.:

A1—0 to 4 inches, dark brown (10YR 3/3) loam; weak fine and medium granular structure; friable; many fine and medium roots; few fine to medium sandstone fragments; medium acid; clear wavy boundary.

B21t—4 to 17 inches, yellowish red (5YR 4/6) clay; strong fine and medium subangular and angular blocky structure; firm, plastic, sticky; few fine and medium roots; continuous clay films on faces of peds; few fine mica flakes; very strongly acid; clear wavy boundary.

B22t—17 to 24 inches, yellowish red (5YR 4/8) silty clay; common medium distinct red (2.5YR 4/8) mottles; moderate fine and medium subangular blocky structure; firm, plastic, sticky; continuous clay films on faces of peds; common fine gray shale fragments; common mica flakes; very strongly acid; clear wavy boundary.

B3t—24 to 40 inches, mottled yellowish red (5YR 4/8), red (2.5YR 4/6), and grayish brown (2.5Y 5/2) clay loam with weathered shale fragments; weak platy structure breaking to weak medium subangular

blocky structure; friable to firm; thin patchy clay films; common mica flakes; very strongly acid; gradual wavy boundary.

C—40 to 60 inches, stratified grayish brown (2.5Y 5/2) partially weathered shale and yellowish brown (10YR 5/6) fine sandy loam; structureless; shale has rock structure; common mica flakes; very strongly acid.

Thickness of the solum ranges from 20 to 40 inches. Reaction is medium acid to very strongly acid.

The A horizon is dark brown, brown, or dark yellowish brown. The B2t horizon is yellowish red, red, or reddish brown. Texture is silty clay, clay, or clay loam. The B3t horizon has similar colors or is mottled in shades of red, gray, or yellow. Texture of the B3t horizon is clay loam, silty clay loam, or loam. In some pedons up to 50 percent of the B3t horizon is shale with platelike rock structure. The C horizon is stratified fine sandy loam and partially weathered shales rich in mica. Color of the C horizon is in various shades of red, yellow, and gray.

Maben soils are associated with Tippah and Wilcox soils. Maben soils are more clayey in the Bt horizon than Tippah. Wilcox soils have mottles of chroma 2 or less in the upper 10 inches of the Bt horizon.

## Oaklimeter Series

The Oaklimeter series consists of moderately well drained soils formed in silty alluvium. Oaklimeter soils are on flood plains. Slopes are 0 to 2 percent.

Typical pedon of Oaklimeter silt loam in an area used for pasture and crops approximately 2-3/4 miles north of Eupora, Mississippi; 60 yards west of highway, SW1/4NE1/4 sec. 20, T. 20 R., 10 E.:

Ap—0 to 7 inches, brown (10YR 5/3) silt loam, common medium faint pale brown (10YR 6/3) and common medium distinct dark yellowish brown (10YR 4/4) mottles; weak fine granular structure; friable; many fine and medium roots, few fine black and brown concretions; strongly acid; abrupt smooth boundary.

B21—7 to 16 inches, dark yellowish brown (10YR 4/4) silt loam, common medium faint pale brown (10YR 6/3) and yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; friable; common fine roots; few fine and medium black and brown concretions; strongly acid; clear wavy boundary.

B22—16 to 27 inches, mottled yellowish brown (10YR 5/4), light brownish gray (10YR 6/2), yellowish brown (10YR 5/6), and dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; few fine roots; many fine and medium black and brown concretions; strongly acid; clear wavy boundary.

A2b and B21tb—27 to 35 inches, mottled light brownish gray (10YR 6/2), yellowish brown (10YR 5/4), and dark brown (10YR 4/3) silt loam; weak medium subangular blocky structure; brown portion slightly brittle, gray portion friable; brown coats on some peds; few fine roots; few crawfish channels; many fine and medium black and brown concretions; strongly acid; gradual wavy boundary.

B22tb—35 to 46 inches, mottled pale brown (10YR 6/3), brown (10YR 5/3), light brownish gray (10YR 6/2), and yellowish brown (10YR 5/6) silt loam; weak coarse prismatic parting to weak medium subangular blocky structure; firm and brittle; few fine roots; patchy clay films on prism faces; gray silty clay loam between prism faces; common pockets of gray silt; gray silt coats on some ped faces; few fine pores and voids; few crawfish channels; many fine and medium black and brown concretions; strongly acid; gradual wavy boundary.

B23tb—46 to 72 inches, light brownish gray (2.5Y 6/2) silt loam; many medium prominent yellowish brown (10YR 5/6) and brownish yellow (10YR 6/6) mottles; weak medium prismatic parting to weak medium subangular blocky structure; firm; few fine roots; gray seams 1/4 to 1/2 inch wide between prisms; few silt coats on some ped faces; continuous clay films on prism faces; common voids; few crawfish channels; many fine and medium black and brown concretions; strongly acid.

Solum thickness is more than 60 inches. Reaction of the soil is strongly acid to very strongly acid, except where the A horizon has been limed.

Color of the A horizon is dark grayish brown, dark yellowish brown, dark brown or brown. The B21 horizon is brown, dark brown, dark yellowish brown, or yellowish brown. Grayish mottles range from none to common. The B22 horizon has similar colors as the B21 horizon, except grayish mottles are few to many or the horizon is mottled in shades of gray and brown. The texture of the B2 horizon is silt loam, very fine sandy loam, or loam. Clay content of the 10 to 40 inch control section is 7 to 18 percent, and sand content coarser than very fine sand is less than 15 percent. The A2b, B21tb, B22tb, and B23tb horizons are mottled in shades of brown and gray or may have gray matrix colors. Texture of the buried horizons is silt loam or silty clay loam. Depth to the buried horizons ranges from 20 to 40 inches. Brown and black concretions range from few to many.

Oaklimeter soils are associated with Ariel, Arkabutla, Chenneby, and Guyton soils. Ariel soils are better drained, and their B horizon lacks gray mottles caused by wetness. Arkabutla and Chenneby soils are more than 18 percent clay in the control section and lack buried horizons. Guyton soils are grayer and are poorly drained.

## Ora Series

The Ora series consists of moderately well drained soils with a fragipan. These soils formed in thick loamy material. The Ora soils are on ridgetops and upper side slopes. Slopes range from 5 to 12 percent.

Typical pedon of Ora loam in an area of Ora loam, 5 to 8 percent slopes, eroded, in an area of cropland approximately 2.5 miles northwest of Clarkson, Mississippi; 0.2 mile east of Savannah fire tower, 18 feet south of gravel road, SW1/4SE1/4 sec. 19, T. 21 N., R. 11 E.:

Ap—0 to 4 inches, yellowish brown (10YR 5/4) loam; weak fine and medium granular structure; very friable; many fine roots; strongly acid; abrupt wavy boundary.

B1—4 to 7 inches, yellowish red (5YR 4/8) loam with some mixing of Ap material in wormholes and cracks; weak fine medium subangular blocky structure; friable; few fine roots; strongly acid; clear wavy boundary.

B21t—7 to 16 inches, yellowish red (5YR 4/6) clay loam; moderate medium subangular blocky structure; friable, slightly plastic, slightly sticky; few fine roots; clay films in cracks and pores; strongly acid; gradual smooth boundary.

B22t—16 to 21 inches, yellowish red (5YR 5/6) loam with red (2.5YR 4/8) coatings on ped faces and few fine prominent pale brown mottles; moderate fine and medium subangular blocky structure; friable, slightly plastic, slightly sticky; few fine roots; continuous clay films on ped faces; strongly acid; clear smooth boundary.

Bx1—21 to 30 inches, yellowish red (5YR 5/6) fine sandy loam with common medium distinct red (2.5YR 4/6) and pale brown (10YR 6/3) mottles; few fine prominent gray mottles; weak coarse prismatic structure parting to moderately medium subangular blocky structure; firm; compact, brittle; few patchy clay films on ped faces; few black coatings on some ped faces; strongly acid; gradual smooth boundary.

Bx2—30 to 40 inches, yellowish red (5YR 5/6) fine sandy loam with common medium prominent pale brown (10YR 6/3) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky structure; firm; compact, brittle; few patchy clay films on faces of peds; strongly acid; gradual smooth boundary.

Bx3—40 to 48 inches, yellowish red (5YR 4/8) loam with common fine prominent yellowish brown, pale brown, and light brownish gray mottles; weak coarse prismatic structure parting to moderate medium subangular blocky structure; firm; compact, brittle; slightly plastic, slightly sticky; few patchy clay films on faces of peds; strongly acid; gradual smooth boundary.

C—48 to 60 inches, red (2.5YR 4/8) sandy clay loam with common medium prominent yellowish brown (10YR 5/6) mottles; structureless; friable; strongly acid.

Depth to the fragipan ranges from 18 to 30 inches. Reaction ranges from strongly acid to very strongly acid throughout the soil profile.

The Ap horizon is dark grayish brown, brown, or yellowish brown. A thin A1 horizon is dark gray, very dark grayish brown, or very dark gray. The B1 horizon, if present, is a yellowish red or strong brown. The B2t horizon is yellowish red or red. Texture is a clay loam, sandy clay loam, or loam. The Bx and C horizons are mottled yellow, brown, gray, or red or have a red, yellowish-red, or strong brown matrix that is mottled with gray and brown. The Bx and C horizons are sandy clay loam, loam, or fine sandy loam.

Ora soils are associated with Providence, Smithdale, Sweatman, and Tippah soils. Providence soils have a fine silty B2 horizon.

## Ozan Series

The Ozan series consists of poorly drained soils formed in loamy material. Ozan soils are on stream terraces. Slopes are 0 to 2 percent.

Typical pedon of Ozan silt loam described in an area used for pasture approximately 8.5 miles northwest of Tomnolen, Mississippi; 56 yards east of Montgomery County line, SW1/4SW1/4 sec. 18, T. 19 N., R. 8 E.:

Ap—0 to 6 inches, grayish brown (10YR 5/2) silt loam with common fine distinct strong brown (7.5YR 5/6) mottles; weak fine granular structure; many fine roots; few fine black and brown concretions; medium acid; abrupt smooth boundary.

A21g—6 to 14 inches, light brownish gray (2.5Y 6/2) sandy loam with few medium distinct yellowish brown (10YR 5/6) and few fine faint light olive brown mottles; weak fine granular and weak medium subangular blocky structure; friable; common fine roots; common medium black and brown concretions; medium acid; clear wavy boundary.

A22g and B1g—14 to 26 inches, light brownish gray (2.5Y 6/2) sandy loam with common medium distinct yellowish brown (10YR 5/6) and common fine faint light olive brown mottles; weak fine granular and weak medium subangular blocky structure; friable; few fine roots; common fine and coarse black and brown concretions; medium acid; clear irregular boundary.

B21tg and A23g—26 to 40 inches, light brownish gray (2.5Y 6/2) sandy loam with many coarse prominent dark brown (10YR 4/3) and yellowish brown (10YR 5/4) mottles; moderate coarse prismatic structure parting to weak medium subangular blocky structure; friable; slightly brittle; yellowish brown pockets about 3 millimeters wide surround the prism faces; many pockets and interfingering of gray A2 material; the brown material makes up 40 percent of the mass, which is brittle; bridging and coating of some sand grains with clay and oxides; few patchy clay films; common fine pores and voids; many fine and coarse black and brown concretions; medium acid; gradual wavy boundary.

B22tg and A24g—40 to 60 inches, light brownish gray (10YR 6/2) sandy loam; many medium distinct dark brown (10YR 4/3) mottles; moderate coarse prismatic structure parting to weak medium subangular blocky structure; friable; many pockets and interfingering of gray A2 material 1 to 2 inches wide; approximately 10 percent of volume is A material; bridging and coating of some sand grains with clay and oxides; many fine pores; many fine and coarse black and brown concretions; medium acid; gradual wavy boundary.

B23tg—60 to 67 inches, light gray (10YR 7/1) sandy clay loam; many medium distinct strong brown (7.5YR 5/6) mottles; moderate coarse prismatic structure parting to weak medium subangular blocky structure; firm; gray silt tongues 1 inch wide occurring at 6 inch intervals approximately 10 percent of volume; patchy clay films; common medium brown concretions; strongly acid; gradual wavy boundary.

B24tg—67 to 80 inches, mottled brown (10YR 5/3), dark brown (10YR 4/3), light gray (10YR 7/1), and yellowish brown (10YR 5/6) sandy clay loam; moderate coarse prismatic structure parting to weak medium subangular blocky structure; friable; gray pockets and interfingering silty material 1 inch wide about 10 percent of volume; patchy clay films; common medium black and brown concretions; medium acid.

Thickness of the solum is more than 60 inches. Reaction ranges from medium acid to very strongly acid throughout.

Color of the Ap horizon is grayish brown, gray, light brownish gray, dark grayish brown, or dark brown or is mottled in shades of gray and brown. The A2g horizon has a gray, light brownish gray, light gray, or grayish brown matrix with few to many yellowish brown or olive brown mottles. Texture is silt loam, loam, or sandy loam. The upper B horizon is a gray, light gray or light brownish gray matrix with few to many brown, yellowish brown, or olive brown mottles. The texture is sandy loam or loam. The lower B2 horizon is similar in color or may be mottled in shades of brown and gray. Texture of the lower B horizon is a sandy clay loam, loam, or sandy loam. Most pedons have few to many black and yellowish brown concretions.

Soils of the Ozan series have a slightly thicker A2 horizon than is defined as the range for the series, but this difference does not alter their uefulness and behavior.

Ozan soils are associated with Guyton, Oaklimeter, and Stough soils. Ozan soils are similar to Guyton soils in drainage, but are more than 15 percent sand greater than very fine sand in the control section. Ozan soils are not so well drained as the Oaklimeter and Stough soils.

## Prentiss Series

The Prentiss series consists of moderately well drained soils formed in loamy sediments. Prentiss soils have a fragipan and are on uplands. Slopes range from 2 to 5 percent.

Typical pedon of Prentiss silt loam, 2 to 5 percent slopes, described in an area of timberland approximately 1 mile northeast of Dancy, Mississippi; NE1/4NW1/4 sec. 24, T. 16 S., R. 2 E.:

A1—0 to 1 inch, very dark grayish brown (10YR 3/2) silt loam with appreciable sand; weak fine granular structure; very friable; many fine and medium roots; very strongly acid; abrupt smooth boundary.

A12—1 to 6 inches, dark brown (10YR 4/3) silt loam with appreciable sand; very dark grayish brown (10YR 3/2) in root channels; weak medium granular structure; very friable; many fine and medium roots; very strongly acid; abrupt smooth boundary.

B1—6 to 11 inches, yellowish brown (10YR 5/6) silt loam with appreciable sand; weak fine medium subangular blocky structure; friable; common medium roots; very strongly acid; clear wavy boundary.

B21—11 to 22 inches, yellowish brown (10YR 5/6) silt loam with appreciable sand; moderate medium subangular blocky structure; friable; few fine roots; sand grains coated and bridged with clay; strongly acid; clear smooth boundary.

B22—22 to 29 inches, yellowish brown (10YR 5/6) silt loam with appreciable sand and many medium prominent light yellowish brown (2.5Y 6/4) mottles; moderate medium subangular blocky structure; friable; common fine black concretions; few soft yellowish brown concretions; sand grains coated and bridged with clay; common fine voids; strongly acid; clear smooth boundary.

Bx1—29 to 40 inches, mottled yellowish brown (10YR 5/6), yellow (10YR 7/6), light brownish gray (2.5Y 6/2), and light yellowish brown (2.5Y 6/4) silt loam with appreciable sand; weak coarse prismatic structure parting to weak fine and medium subangular blocky structure; firm; brittle and compact in about 70 percent of volume; few black coatings on ped faces; gray seams of less clayey material between prisms; common fine and medium yellowish brown concretions; strongly acid; gradual wavy boundary.

Bx2—40 to 50 inches, mottled yellow (10YR 7/6), yellowish brown (10YR 5/6, light brownish gray (2.5Y 6/2), and gray (10YR 6/1) silt loam

with appreciable sand; weak coarse prismatic structure parting to weak medium subangular blocky structure; firm; brittle and compact in about 70 percent of volume; gray seams of less clayey material between prisms; many fine yellowish brown and black concretions; strongly acid; gradual wavy boundary.

Bx3—50 to 60 inches, mottled strong brown (7.5YR 5/8), gray (10YR 6/1), and light yellowish brown (10YR 6/4) silt loam; weak coarse prismatic structure parting to weak fine and medium subangular blocky structure; firm; brittle and compact in about 70 percent of volume; gray seams of less clayey material between prisms; many fine yellowish brown and black concretions; strongly acid.

Thickness of the solum is more than 60 inches. Reaction of the soil is strongly acid to very strongly acid.

Color of the A1 horizon is very dark gray, very dark grayish brown, dark brown, or dark grayish brown. The Ap or A2 horizon is dark grayish brown, dark brown, or grayish brown. Texture is silt loam or fine sandy loam. Some pedons have a yellowish brown B1 horizon. The B2 horizon is yellowish brown, light yellowish brown, pale brown, or light olive brown, but ranges to strong brown and generally has few to common pale brown or light yellowish brown mottles in the lower part. The B and Bx horizons are silt loam, loam, or fine sandy loam. The Bx horizon has colors similar to those of the B2 horizon or has mottles in shades of brown, gray, or yellow. Clay content ranges from 5 to 18 percent, and sand more than 15 percent coarser than very fine sand.

Prentiss soils are associated with the Longview, Ora, and Stough soils. Prentiss soils have a less clayey B horizon than Longview and Ora soils. Stough and Longview soils do not have the fragipan of the Prentiss soils.

## Providence Series

The Providence series consist of moderately well drained soils with a thin mantle of silty material over loamy material. Providence soils have a fragipan and are on ridgetops and upper side slopes. Slopes range from 0 to 35 percent but are dominantly 0 to 12 percent.

Typical pedon of Providence silt loam, 2 to 5 percent slopes, eroded, described approximately 1-1/2 miles east of Eupora and 10 yards west of V.F.W. Road; SE1/4NW1/4 sec. 3, T. 19 N., R. 10 E.:

Ap—0 to 5 inches, light yellowish brown (10YR 6/4) silt loam with few fine faint yellowish brown mottles; weak fine granular structure; very friable; many fine and medium roots; some dark grayish brown silt loam in root channels; strongly acid; abrupt smooth boundary.

B1—5 to 8 inches, yellowish brown (10YR 5/6) silt loam with few common faint light yellowish brown mottles; weak fine subangular blocky structure; very friable; common fine and medium roots; very strongly acid; clear smooth boundary.

B21t—8 to 17 inches, strong brown (7.5YR 5/6) silt loam; moderate medium subangular blocky structure; friable; common fine and medium roots; thin patchy clay films on peds; strongly acid; clear smooth boundary.

B22t—17 to 22 inches, strong brown (7.5YR 5/6) silt loam with common medium distinct pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; friable; few fine and medium roots; thin patchy clay films on ped faces; very strongly acid; clear smooth boundary.

Bx1—22 to 28 inches, yellowish brown (10YR 5/6) silt loam with common medium distinct pale brown (10YR 6/3) and yellowish red (5YR 4/6) mottles; weak coarse prismatic structure parts to moderate medium subangular blocky structure; firm; compact and brittle; thin patchy clay films on ped faces; common medium black concretions and brown stains; strongly acid; gradual smooth boundary.

IIBx2—28 to 39 inches, mottled strong brown (7.5YR 5/6), gray (10YR 6/1), and pale brown (10YR 6/3) loam; weak coarse prismatic structure parting to moderate medium subangular blocky structure; firm; compact and brittle; thin patchy clay films on ped faces; few fine black and strong brown concretions; strongly acid; gradual smooth boundary.

IIBx3—39 to 47 inches, yellowish brown (10YR 5/6) loam with common medium distinct light gray (10YR 7/1), pale brown (10YR 6/3), and strong brown (7.5YR 5/6) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky structure; firm; compact and brittle; thin patchy clay films on ped faces; few fine strong brown concretions; strongly acid; gradual smooth boundary.

IIBx4—47 to 60 inches, mottled yellowish brown (10YR 5/6), light gray (10YR 7/1), pale brown (10YR 6/3), and strong brown (7.5YR 5/6) loam; weak coarse prismatic structure; firm; compact and brittle; thin patchy clay films on ped faces; few medium strong brown concretions; strongly acid.

Thickness of the solum is more than 60 inches. Depth to the fragipan ranges from 18 to 32 inches. The reaction is medium acid to very strongly acid.

The Ap horizon is dark grayish brown, dark brown, light yellowish brown, or yellowish brown. The B1 horizon, if present, is yellowish brown, strong brown, or dark brown. The B2t horizon is strong brown, yellowish brown, brown, and yellowish red silt loam or silty clay loam. The fragipan has yellowish red to yellowish brown matrix colors that are mottled in gray, brown, and red, or are mottled in shades of yellow, brown, gray, and red. The upper part of the fragipan is silty clay loam or silt loam that contains evident amounts of sand. Texture in the lower part ranges from loam, or clay loam to sandy clay loam.

Providence soils are associated with Bude, Smithdale, Sweatman, and Tippah soils. Providence soils are better drained than the Bude soils. Providence soils are less sandy than the Smithdale soils and are less clayey than Sweatman soils. The Smithdale, Sweatman, and Tippah soils lack a fragipan.

## Smithdale Series

The Smithdale series consists of well drained upland soils formed in loamy materials. Slopes are 12 to 35 percent.

Typical pedon of Smithdale sandy loam described in an area of Smithdale-Ora association, hilly, on Rex May approximately 15 yards west of gravel road NE1/4NW1/4 sec. 17, T. 19 N., R. 8 E.:

A1—0 to 1 inches, dark grayish brown (10YR 4/2) sandy loam; weak fine granular structure; very friable; many fine roots; strongly acid; abrupt smooth boundary.

A2—1 to 7 inches, brown (10YR 5/3) sandy loam; weak fine and medium granular structure; very friable; many fine roots; strongly acid; abrupt smooth boundary.

B21t—7 to 30 inches, red (2.5YR 4/6) sandy clay loam; moderate medium subangular blocky structure; friable; common fine roots; common thin clay films on ped facs; very strongly acid; clear smooth boundary.

B22t—30 to 50 inches, red (2.5YR 4/6) sandy loam; weak medium subangular blocky structure; friable; sand grains coated and bridged with clay and oxides; few pockets of uncoated sand grains; very strongly acid; gradual smooth boundary.

B23t—50 to 83 inches, red (2.5YR 4/8) sandy loam; weak medium subangular blocky structure; very friable; sand grains coated and bridged with clay and oxides; few pockets of uncoated sand grains; very strongly acid.

Solum thickness ranges from 60 to more than 100 inches. Reaction is strongly acid to very strongly acid.

The A1 horizon is dark grayish brown, very dark grayish brown, or dark brown. The Ap and A2 horizons are brown, pale brown, dark brown, grayish brown, and yellowish brown. Some pedons have strong brown or yellowish red B1 horizons. The upper Bt horizon is yellowish red or red sandy clay loam or clay loam. The lower Bt horizon has colors similar to those in the upper Bt horizon except few to many pockets of uncoated sand grains are present. It is loam or sandy loam.

Smithdale soils are associated with Ora, Providence, and Sweatman soils. Ora and Providence soils have a fragipan. Sweatman soils have a Bt horizon with more than 35 percent clay.

## Stough Series

The Stough series consists of somewhat poorly drained soils with loamy subsoils. Stough soils are on broad flats. Slopes range from 0 to 2 percent.

Typical pedon of Stough fine sandy loam, 0 to 2 percent slopes, described approximately 2 miles northwest of Tomnolen, SW1/4SE1/4 sec. 18, T. 19 N., R. 9 E.:

Ap—0 to 6 inches, grayish brown (10YR 5/2) fine sandy loam, common medium distinct dark yellowish brown (10YR 4/4) mottles; weak fine and medium granular structure; friable; few medium roots; few fine and medium black and brown concretions; strongly acid; abrupt smooth boundary.

A&B—6 to 9 inches, mottled grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) loam; weak fine and medium granular structure; friable; few medium roots; few fine and medium black and brown concretions; strongly acid; clear smooth boundary.

B21t—9 to 18 inches, mottled light yellowish brown (10YR 6/4), yellowish brown (10YR 5/6), and gray (10YR 6/1) loam; weak medium subangular blocky structure; friable; clay bridging between sand grains; patchy clay films on some ped faces; common fine and medium black and brown concretions; very strongly acid; clear smooth boundary.

B22t—18 to 27 inches, mottled light gray (10YR 7/1), yellowish brown (10YR 5/6), and light olive brown (2.5Y 5/4) loam; moderate coarse prismatic structure parting to moderate medium subangular blocky structure; friable; brown portion, about 40 percent of volume, is brittle and compact; patchy clay films and bridging of sand grains; prisms separated by gray loamy sand tongues 1/4 to 1/2 inch wide; common fine and medium black and brown concretions; very strongly acid; gradual smooth boundary.

B23t—27 to 37 inches, mottled light gray (10YR 7/1), strong brown (7.5YR 5/6), pale brown (10YR 6/3), and grayish brown (2.5Y 5/2) loam; moderate coarse prismatic structure parting to moderate medium subangular blocky structure; firm; brown portion, about 50 percent of volume, is brittle and compact; patchy clay films and bridging of sand grains; vertical gray tongues 1 inch wide of loamy sand; common fine and medium black and brown concretions; very strongly acid; gradual smooth boundary.

B24t—37 to 50 inches, mottled light gray (10YR 7/1), strong brown (7.5YR 5/6), and yellowish brown (10YR 5/4) fine sandy loam; moderate coarse prismatic structure parting to moderate medium subangular blocky structure; firm; brown portion, about 50 percent of volume, is slightly brittle and compact; gray seams of sandy clay loam between prisms; clay films on some ped faces and bridging of sand grains; few fine black and brown concretions; very strongly acid; gradual smooth boundary.

B25t—50 to 65 inches, mottled light gray (10YR 7/1), yellowish brown (10YR 5/6), and light olive brown (2.5Y 5/4) fine sandy loam; moderate coarse prismatic structure parting to moderate medium subangular blocky structure; firm; brown portion, about 50 percent of the volume, is brittle and compact; gray seams of sandy clay loam between prisms; patchy clay films; few fine black and brown concretions; very strongly acid.

Thickness of the solum exceeds 60 inches. Brown and black concretions range from few to many throughout the profile. Reaction ranges from strongly acid to very strongly acid. The A horizon is dark grayish brown, grayish brown, or pale brown. The A and B horizon, if present, is mottled in shades of brown. The B2t horizon is mottled in shades of brown and gray or has matrix colors of brown with few to many mottles of chroma 2 or less. Texture is loam, fine sandy loam, or sandy clay loam. The B22t through the B25t horizons are slightly brittle and compact in 30 to 50 percent of the volume.

Stough soils are associated with Ora and Ozan soils. Ora soils have a more clayey and redder B horizon and are better drained. The Stough soils are not so gray as the Ozan soils and are better drained.

## Sweatman Series

The Sweatman series consists of well drained soils that have a clayey subsoil over stratified shaly and sandy materials. Sweatman soils are on strongly sloping to hilly side slopes. Slopes range from 8 to 35 percent.

Typical pedon of Sweatman loam described in an area of Sweatman-Providence association, hilly, 0.8 mile north of Crossroads Baptist Church, SE1/4SW1/4 sec. 3, T. 21 N., R. 11 E.:

A1—0 to 6 inches, very dark grayish brown (10YR 3/2) loam; weak fine granular structure; very friable; many fine and medium sandstone fragments; many fine roots; strongly acid; clear smooth boundary.

B21t—6 to 18 inches, red (2.5YR 4/6) silty clay; moderate medium subangular and angular blocky structure; firm, plastic; common fine roots; patchy clay films on ped faces; few medium sandstone fragments; few mica flakes; very strongly acid; clear smooth boundary.

B22t—18 to 23 inches, red (2.5YR 4/6) silty clay with common medium distinct yellowish brown (10YR 5/8) and pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; firm, plastic, sticky; few fine roots; patchy clay films on ped faces; common mica flakes; very strongly acid; clear smooth boundary.

B3t—23 to 30 inches, red (2.5YR 4/6) silty clay loam with many medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; firm; few fine roots; few fine distinct grayish brown (2.5Y 5/2) shale fragments; patchy clay films on ped faces; common fine mica flakes; very strongly acid; clear smooth boundary.

C1—30 to 45 inches, mottled dark red (2.5YR 3/6) and strong brown (7.5YR 5/6) sandy clay loam with lenses of sandy material; structureless; firm; few fine roots; many fine and medium distinct light olive brown (2.5Y 5/4) shale fragments; common fine mica flakes; very strongly acid; gradual smooth boundary.

C2—45 to 60 inches, mottled dark red (2.5YR 3/6) and yellowish red (5YR 4/8) sandy loam with stratified light yellowish brown (2.5Y 6/4) and grayish brown (2.5Y 5/2) weathered shale; structureless; firm; few medium black concretions; common mica flakes; very strongly acid.

Thickness of the solum ranges from 20 to about 40 inches. Reaction is strongly acid or very strongly acid. The A horizon is very dark grayish brown, dark grayish brown, grayish brown, brown, or dark brown. The B2t horizon is red or yellowish red. Texture of the Bt horizon is silty clay loam, silty clay, or clay. The clay content in the upper 20 inches ranges from 35 to 55 percent, and the silt content ranges from 30 to 50 percent. The B3t horizon is red, yellowish red, or strong brown, or is mottled in shades of red, brown, and gray. Texture is silty clay loam, sandy clay loam, or silty clay. Some pedons have shale fragments in this horizon. Color of the C horizon is in various shades of red, brown, and gray. The C horizon is stratified fine sandy loam, sandy clay loam, loam, and weathered shales rich in mica.

Sweatman soils are associated with Ora, Providence, Smithdale, and Tippah soils. The Sweatman soils have a more clayey Bt horizon. Ora and Providence soils have a fragipan.

## Tippah Series

The Tippah series consists of moderately well drained soils with silty material over clayey subsoils. The Tippah soils are on ridgetops and upper side slopes. Slopes range from 2 to 35 percent but are dominantly 2 to 12 percent.

Typical pedon of Tippah silt loam in an area of Tippah silt loam, 5 to 8 percent slopes, eroded, in an area of

cropland east of gravel road in front of house on McKee farm, NW1/4NE1/4 sec. 4, T. 20 N., R. 10 E., NW-2G-148:

Ap—0 to 5 inches, dark grayish brown (10YR 4/2) silt loam with few medium prominent yellowish red (5YR 4/6) mottles in lower part; weak fine granular structure; very friable; many fine roots; few worm casts; strongly acid; abrupt smooth boundary.

B21t—5 to 16 inches, yellowish red (5YR 4/6) silty clay loam; moderate fine and medium subangular blocky structure; friable; many fine roots; thin patchy clay films on ped faces; few old root channels filled with Ap material; very strongly acid; clear smooth boundary.

B22t—16 to 22 inches, strong brown (7.5YR 5/6) silty clay loam with common medium distinct yellowish brown (10YR 5/6) and few medium distinct light brownish gray (10YR 6/2) mottles in lower part; moderate medium subangular blocky structure; friable; common fine roots; patchy clay films on ped faces; few fine brown concretions; very strongly acid; clear smooth boundary.

B23t—22 to 28 inches, yellowish red (5YR 4/6) silty clay loam; common medium distinct light brownish gray (10YR 6/2) and faint pale brown (10YR 6/3) mottles; moderate medium subangular and angular blocky structure; firm; few fine roots; clay films on ped faces; light gray silt in cracks; common fine brown and red concretions; few small sandstone fragments; strongly acid; abrupt wavy boundary.

IIB24t—28 to 46 inches, mottled yellowish red (5YR 4/8), light olive brown (2.5Y 5/4), and gray (10YR 6/1) clay; strong fine and medium subangular and angular blocky structure; firm, plastic, sticky; continuous clay films or pressure faces; very strongly acid; gradual wavy boundary.

IIB25t—46 to 66 inches, light brownish gray (2.5Y 6/2) silty clay with many medium faint light olive brown (2.5Y 5/6) and many medium prominent red (2.5YR 4/6) mottles; strong medium angular and subangular blocky structure; very firm, plastic, sticky; many shiny pressure faces or clay films on peds; very strongly acid.

Thickness of the solum is more than 60 inches. Depth to underlying clayey layer ranges from 24 to 35 inches. Reaction ranges from medium acid to very strongly acid.

The A horizon is dark grayish brown, very dark grayish brown, or yellowish brown. Color of the B21t horizon is strong brown, yellowish red, or red. The matrix of the B22t and B23t horizons has colors similar to those in the B21t horizon, but the horizon contains few to many mottles in shades of brown and gray. The B2t horizon is a silt loam or silty clay loam, and the upper 20 inches averages 20 to 35 percent clay and less than 15 percent fine and coarser sand. The matrix of the IIBt horizon is red to gray, or the horizon is mottled yellow, brown, red, or gray. The IIBt horizon is a silty clay loam, silty clay, or clay.

Tippah soils are associated with Bude, Falkner, Longview, Providence, and Wilcox soils. Tippah soils are better drained than the Falkner, Longview, and Wilcox soils. The Bude and Providence soils have a fragipan.

## Urbo Series

The Urbo series consists of somewhat poorly drained soils that have clayey subsils. The Urbo soils are on broad flood plains. Slopes are 0 to 2 percent.

Typical pedon of Urbo silty clay loam, described 130 yards east of Mississippi Highway 15 on Barton farm, NE1/4NE1/4 sec. 14, T. 16 S., R. 2 E.:

Ap—0 to 6 inches, dark grayish brown (10YR 4/2) silty clay loam; weak fine and medium granular structure; friable; many fine roots; few fine black concretions; medium acid; clear smooth boundary.

B21g—6 to 13 inches, grayish brown (2.5Y 5/2) silty clay loam with few fine distinct yellowish brown and few medium faint light brownish gray mottles; weak medium subangular blocky structure; friable; common fine roots; few fine black and brown concretions; very strongly acid; clear smooth boundary.

B22g—13 to 25 inches, grayish brown (2.5Y 5/2) silty clay with common medium distinct yellowish brown (10YR 5/6) and few fine distinct dark yellowish brown mottles; weak medium subangular blocky structure; firm, plastic, sticky; few fine roots; few pressure faces on peds; few fine black and brown concretions; very strongly acid; gradual smooth boundary.

B23g—25 to 43 inches, grayish brown (2.5Y 5/2) silty clay with common medium distinct yellowish brown (10YR 5/6) and few fine distinct dark yellowish brown mottles; weak coarse prismatic structure parting to weak medium subangular structure; firm, very plastic, sticky; few fine roots; few pressure faces on peds; few fine black and brown concretions; very strongly acid; gradual smooth boundary.

B24g—34 to 72 inches, grayish brown (2.5Y 5/2) silty clay with many medium faint light olive brown (2.5Y 5/6) and common medium prominent red (2.5YR 4/6) mottles; weak coarse prismatic structure parting to weak moderate angular and subangular blocky structure; firm, very plastic, very sticky; few pressure faces on peds; few fine black and brown concretions; very strongly acid.

Thickness of the solum is more than 60 inches. Reaction ranges from strongly acid to very strongly acid except for the surface layer that has been limed. Black and brown concretions range from few to common throughout the profile.

The A horizon is dark grayish brown, grayish brown, and dark brown. The B21 horizon is dark grayish brown, grayish brown, brown, dark brown, yellowish brown, and dark yellowish brown silty clay loam. Most pedons have few to many mottles of gray, brown, or yellow. The B22, B23, and B24 horizons are dark grayish brown, grayish brown, light brownish gray, light gray, or gray. The lower B horizon is silty clay or clay. The 10 to 40 inch control section is between 40 and 55 percent clay.

Urbo soils are associated with Arkabutla and Chenneby soils. Arkabutla and Chenneby soils are less than 35 percent clay in the 10 to 40 inch control section.

## Verdun Variant

The Verdun variant consists of moderately well drained soils formed in silty materials. Verdun soils are on broad flats. Slopes range from 0 to 2 percent.

Typical pedon of Verdun variant silt loam, described approximately 3 miles east of Eupora on Mississippi Highway 82, SE1/2NE1/4 sec. 2, T. 19 S., R. 10 E.:

Ap—0 to 4 inches, dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

A2—4 to 7 inches, grayish brown (10YR 5/2) silt loam; common fine distinct dark brown mottles; weak fine granular and weak fine subangular blocky structure; friable; many fine roots; common fine black and brown concretions; slightly acid; clear irregular boundary.

B21t—7 to 20 inches, yellowish brown (10YR 5/4) silty clay loam; common medium and fine medium distinct yellowish brown (10YR 5/6) and light brownish gray (10YR 6/2) mottles; moderate coarse columnar structure; firm; common fine roots around prisms; thick dark grayish brown clay films on some ped faces; pale brown silt 1/2 to 1-1/2 inches thick is biscuit shaped on top of prisms and extends to tongues between prisms in varvedlike manner; common black and brown concretions; moderately alkaline; gradual wavy boundary.

B22t—20 to 42 inches, pale brown (10YR 6/3) exterior of peds, mottled light brownish gray (10YR 6/2), yellowish brown (10YR 5/6), and light olive brown (2.5Y 5/4) interior of peds; silty clay loam; weak coarse prismatic parting to moderate medium angular and subangular blocky structure; firm, hard; few fine roots; nearly continuous clay films on ped faces; common tongues and interfingering of light brownish gray (10YR 6/2) silt 1/2 to 2 inches wide between prisms; common fine and medium black and brown concretions; strongly alkaline; gradual wavy boundary.

B23t—42 to 64 inches, mottled light brownish gray (10YR 6/2), yellowish brown (10YR 5/6), and light olive brown (2.5Y 5/4) silt loam; weak

coarse prismatic parting to moderate medium subangular blocky structure; firm; gray silty clay loam tongues 1/2 to 2 inches wide between prisms occur approximately every 8 inches; patchy clay films; black weblike coatings on ped faces; few fine and medium black and brown concretions; strongly alkaline; gradual wavy boundary.

B24t—64 to 75 inches, mottled light brownish gray (10YR 6/2), yellowish brown (10YR 5/6), and light olive brown (2.5Y 5/4) silty clay loam; weak coarse prismatic parts to moderate medium subangular blocky structure; firm; gray silty clay loam seams 1/2 to 2 inches wide between prisms occur approximately every 8 inches; patchy clay films; few fine calcite concretions; strongly alkaline.

Reaction of the A horizon is slightly acid to mildly alkaline. The B horizon is neutral to strongly alkaline. Calcite concretions are few to common in the lower part of the B horizon. The Ap and A2 horizons are dark grayish brown, grayish brown, brown, or dark brown. Color of the Bt horizon is a yellowish brown, pale brown, or light olive brown with few to many light brownish gray or gray mottles, or it may be mottled in shades of yellow, brown, olive brown, and gray. Texture of the B2t horizon is a silt loam or silty clay loam. Prisms are surrounded by tongues and interfingering of gray silty material.

Verdun soils are associated with Bonn, Bude, and Stough soils. Verdun soils are not so gray and are better drained than the Bonn soils. Bude and Stough soils do not have natric horizons.

### Wilcox Series

The Wilcox series consists of somewhat poorly drained soils that have clayey materials over shale. Wilcox soils are on broad flats and upper side slopes. Slopes range from 2 to 35 percent, but are dominantly 2 to 12 percent.

Typical pedon of Wilcox silty clay loam, 2 to 5 percent slopes, eroded, described in a 120 acre area on Crowly farm, NE1/4NE1/4 sec. 28, T. 20 N., R. 12 E.:

Ap—0 to 4 inches, dark brown (10YR 4/3) silty clay loam with common medium prominent strong brown (7.5YR 5/8) mottles; moderate fine granular structure; friable; slightly plastic; many fine roots; medium acid; abrupt smooth boundary.

B21t—4 to 8 inches, reddish brown (2.5YR 4/4) silty clay loam with common medium prominent gray (10YR 6/1) and light brownish gray (10YR 6/2) mottles; moderate fine and medium subangular blocky structure; firm, plastic, slightly sticky; few fine roots; shiny pressure faces or clay films on peds; clay films in some pores; very strongly acid; clear smooth boundary.

B22t—8 to 21 inches, mottled red (2.5YR 4/8), gray (10YR 6/1), and grayish brown (2.5Y 5/2) silty clay; moderate medium subangular and angular blocky structure; firm, plastic, sticky; few fine roots; pressure faces or clay films on peds; clay films in some pores; very strongly acid; gradual wavy boundary.

B23t—21 to 44 inches, mottled grayish brown (2.5Y 5/2), light olive brown (2.5Y 5/6), gray (5Y 6/1), and yellowish brown (10YR 5/8) silty clay; moderate medium subangular and angular blocky structure; firm, plastic, sticky; common medium slickensides that do not intersect; pressure faces or clay films on ped faces; few fine black and dark brown concretions; extremely acid; gradual wavy boundary.

B24t—44 to 50 inches, gray (5Y 5/1) clay with many medium and coarse distinct olive brown (2.5Y 4/4) and light olive brown (2.5Y 5/6) mottles; moderate medium subangular and angular blocky structure; firm, plastic, sticky; common medium slickensides that do not intersect; pressure faces or clay films on peds; few partially weathered shale fragments; common medium black and yellowish brown concretions; extremely acid; clear smooth boundary.

C—50 to 72 inches, stratified gray (5Y 5/1), pale olive (5Y 6/4), and light olive brown (2.5Y 5/6) soft shale; platy; black (5Y 2/1) coatings in cracks; extremely acid.

Thickness of the solum ranges from 30 to 55 inches. Reaction ranges from strongly acid to extremely acid except in surface layers that have been limed.

The Ap horizon is dark brown or dark grayish brown with a few to many yellowish brown, yellowish red, or strong brown mottles. The B21t, B22t, and B23t horizons are mottled yellow, red, and gray, or the matrix is red to strong brown and contains few to many mottles in shades of gray and brown. In some pedons the lower part of the B horizon has a gray matrix. The Bt horizon is silty clay loam, silty clay, or clay. The upper 20 inches of the Bt horizon is 38 to 60 percent clay. The C horizon has a gray matrix or is mottled gray, yellow, or red.

Wilcox soils are associated with Falkner, Maben, and Tippah soils. Wilcox soils are not so well drained as the Tippah soils and lack the thin layer of silty material over clay that is characteristic of the Tippah and Falkner soils. Wilcox soils are more clayey throughout and are not so well drained as the Maben soils.

## Formation of the Soils

This section discusses the factors of soil formation, relates them to the formation of soils in the survey area, and explains the processes of soil formation.

### Parent Material

Parent material, the unconsolidated mass in which a soil forms, largely determines the chemical and mineralogical composition of a soil. The parent materials of the soils in Webster County are Coastal Plain sediments of marine origin and loess and alluvium.

Most soil scientists think the loess is largely glacial rock flour that was carried southward and deposited on flood plains by streams from melting ice and later redeposited by wind on the older Coastal Plain formations.

Some of the soils in Webster County formed in more than one kind of parent material. Where the overlying layer of loess is thin, the upper soil horizons formed in weathered loess and the lower soil horizons formed in Coastal Plain materials. Providence soils are examples.

The parent materials in the steeper areas of the county are dominantly Coastal Plain sediments of marine origin. The particles of these sediments are mixtures of sands, silt, and clay. Smithdale soils formed in this kind of parent material.

The soils along the streams in the county formed in alluvium washed from the surrounding uplands and redeposited by the streams on the flood plains. The alluvial particles are dominantly silt mixed with sand and clay. Oaklimeter soils formed in this kind of parent material.

### Climate

Climate as a genetic factor affects the physical, chemical, and biological relationships in the soil primarily through the influence of precipitation and temperature. Water dissolves minerals, supports biological activity, and transports mineral and organic residue through the soil profile. The amount of water that percolates through the soil over a broad area depends mainly on the rainfall, the relative humidity, and the length of the frost-free period. The amount of downward percolation is also affected by

physiographic position and soil permeability. In Webster County rainfall is abundant, averaging about 52 inches per year. It is slightly greater in spring and summer than in fall and winter.

The warm temperature influences the kind and growth of organisms and also affects the speed of physical and chemical reactions in the soil. The climate of Webster County is warm and moist and presumedly is similar to that existing when the soils formed. Freezing and thawing in this county have very little effect on weathering and soil-forming processes.

### Living Organisms

Micro-organisms, plants, earthworms, and all other organisms that live on and in the soil have an important effect on its formation. Bacteria, fungi, and other micro-organisms aid in weathering rock and in decomposing organic matter. Larger plants alter the soil climate in small areas (soil microclimate). They also supply organic matter to the soil and transfer elements from the subsoil to the surface soil.

The kinds and numbers of plants and animals that live on and in the soil are determined mainly by climate and, to a varying degree, by parent material, relief, and age of the soil.

Not much is known of the fungi and micro-organisms in the soils of Webster County, except that they are mostly in the top few inches. Earthworms and other small invertebrates are more active in the surface layer, where they continually mix the soil, than in other layers. Mixing of the soil materials by rodents does not appear to be of much consequence in this county.

Except on the bottom land, the native vegetation in Webster County was chiefly oak, hickory, and pine. On the better drained areas of bottom land, the trees were lowland hardwoods, chiefly yellow-poplar, sweetgum, ash, and oak. Cypress, birch, blackgum, beech, and water-tolerant oak grew mainly in the wetter areas of the bottom land.

### Relief

The relief in Webster County ranges from nearly level on the flood plains to steep in the uplands. The relief, or lay of the land, affects the drainage and rate of runoff. Thus relief influences the moisture conditions in soils and the erosion that occurs on the land surface. The rate of runoff is greater on steep slopes than it is on the gentle slopes and level areas. This means that the amount of water that moves through the soil during development depends partly on the relief. In level areas and in depressions, the soils are likely to be gray and wet.

Fragipan formation is also associated with relief and drainage. These compact, brittle horizons have the strongest expressions on level to gently sloping topography and under somewhat poorly drained to moderately well drained conditions. The Bude, Ora, Prentiss, and Providence soils have a fragipan in the profile. Fragipans govern the depth that roots, air, and water can penetrate the soils, as well as the permeability and wetness. In comparison with other factors of soil development, relief and drainage are more local in scope, and their influence on the soil can be observed on small farms. Slope, or lay of land, is important in land use, as well as in productivity of the crops.

### Time

Generally a long time is required for formation of a soil that has distinct horizons. The difference in length of time that parent materials have been in place, therefore, is commonly reflected in the degree of development of the soil profile.

The soils in Webster County range from young to old. The young soils have very little profile development, and the older soils have well-expressed soil horizons.

Arkabutla soils are examples of young soils lacking development. These soils formed in medium textured to moderately fine textured material on flood plains. Examples of older soils that formed in alluvium are those of the Chenneby series. The Chenneby soils are medium textured to moderately fine textured and have a weakly developed soil profile. Examples of older soils that formed on uplands are those of the Providence series. Providence soils are medium textured to moderately fine textured and have distinct horizons.

## Process of Soil Horizon Differentiation

Several processes were involved in the formation of soil horizons in the soils of Webster County. These processes are (1) the accumulation of organic matter, (2) the leaching of calcium carbonates and bases, (3) the reduction and transfer of iron and (4) the formation and translocation of silicate clay minerals. In most of the soils more than one of these processes have been active in the development of horizons.

The accumulation of organic matter in the upper part of the profile is important because this accumulation results in the formation of an A1 horizon. The soils of this county are low in content of organic matter.

Carbonates and bases have been leached from nearly all of the soils in this county. This leaching has contributed to the development of horizons. Soil scientists generally agree that leaching of bases from the upper horizons of a soil commonly precedes the translocation of silicate clay minerals. Most of the soils in this county are moderately to strongly leached.

The reduction and transfer of iron, a process called gleying, is evident in poorly drained soils of the county. This gleying is indicated by the grayish color of the horizons below the surface layer. Segregations of iron are indicated in some horizons by reddish-brown mottles and concretions.

In some soils of Webster County, the translocation of clay minerals has contributed to horizon development. The eluviated A2 horizon, above the B horizon, is lower in

content of clay than the B horizon and generally is lighter in color. The B horizon commonly has accumulations of clay (clay films) in pores and on ped surfaces. Soils of this kind were probably leached of carbonates and soluble salts to a considerable extent before translocation of silicate clays took place.

The leaching of bases and subsequent translocation of silicate clay are among the more important processes of horizon differentiation that have taken place in the soils of Webster County. In the Providence and other soils, translocated silicate clays have accumulated in the B horizon in the form of clay films.

## Classification

The system of soil classification currently used was adopted by the National Cooperative Soil Survey in 1965. Readers interested in further details about the system should refer to the latest literature available (*7*).

The system of classification has six categories. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. In this system the bases for classification are the different soil properties that can be observed in the field or those that can be inferred either from other properties that are observable in the field or from the combined data of soil science and other disciplines. The properties selected for the higher categories are the result of soil genesis or of factors that affect soil genesis. In table 19 the soils of the survey area are classified according to the system. Classes of the system are briefly discussed in the following paragraphs.

ORDER. Ten soil orders are recognized. The properties used to differentiate among orders are those that reflect the kind and degree of dominant soil-forming processes that have taken place. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders based primarily on properties that influence soil genesis and are important to plant growth or that are selected to reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Fluvent (*Fluv*, meaning flood plain, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of expression of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and a prefix that suggests something about the properties of the soil. An example is Udifluvents (*Udi*, meaning humid, *fluv* for flood plain, and *ent* for Entisols).

SUBGROUP. Each great group is divided into three subgroups: the central (typic) concept of the great groups, which is not necessarily the most extensive subgroup; the intergrades, or transitional forms to other orders, suborders, or great groups; and the extragrades, which have some properties that are representative of the great groups but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that is thought to typify the great group. An example is Typic Udifluvents.

FAMILY. Families are established within a subgroup on the basis of similar physical and chemical properties that affect management. Among the properties considered in horizons of major biological activity below plow depth are particle-size distribution, mineral content, temperature regime, thickness of the soil penetrable by roots, consistence, moisture equivalent, soil slope, and permanent cracks. A family name consists of the name of a subgroup and a series of adjectives. The adjectives are the class names for the soil properties used as family differentiae. An example is sandy, mixed, thermic Typic Udifluvents.

SERIES. The series consists of soils that formed in a particular kind of parent material and have horizons that, except for texture of the surface soil, are similar in differentiating characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineralogical and chemical composition.

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# Glossary

**Aggregate, soil.** Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

**Alluvium.** Material, such as sand, silt, or clay, deposited on land by streams.

**Association, soil.** A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single mapping unit.

**Available water capacity (available moisture capacity).** The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

| | *Inches* |
|---|---|
| Very low | 0 to 3 |
| Low | 3 to 6 |
| Moderate | 6 to 9 |
| High | More than 9 |

**Base saturation.** The degree to which material having base exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the exchange capacity.

**Calcareous soil.** A soil containing enough calcium carbonate (commonly with magnesium carbonate) to effervesce (fizz) visibly when treated with cold, dilute hydrochloric acid. A soil having measurable amounts of calcium carbonate or magnesium carbonate.

**Clay.** As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

**Clay film.** A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coat, clay skin.

**Claypan.** A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

**Complex slope.** Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures is difficult.

**Compressible.** Excessive decrease in volume of soft soil under load.

**Concretions.** Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

**Consistence, soil.** The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

*Loose.*—Noncoherent when dry or moist; does not hold together in a mass.

*Friable.*—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

*Firm.*—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

*Plastic.*—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

*Sticky.*—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

*Hard.*—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

*Soft.*—When dry, breaks into powder or individual grains under very slight pressure.

*Cemented.*—Hard; little affected by moistening.

**Corrosive.** High risk of corrosion to uncoated steel or deterioration of concrete.

**Diversion (or diversion terrace).** A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

**Drainage class** (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

*Excessively drained.*—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

*Somewhat excessively drained.*—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

*Well drained.*—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

*Moderately well drained.*—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically for long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

*Somewhat poorly drained.*—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

*Poorly drained.*—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

*Very poorly drained.*—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients, as for example in "hillpeats" and "climatic moors."

**Erosion.** The wearing away of the land surface by running water, wind, ice, or other geologic agents and by such processes as gravitational creep.

*Erosion* (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

*Erosion* (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes a bare surface.

**Excess alkali.** Excess exchangeable sodium. The resulting poor physical properties restrict the growth of plants.

**Excess fines.** Excess silt and clay. The soil does not provide a source of gravel or sand for construction purposes.

**Fertility, soil.** The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

**Flood plain.** A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

**Fragipan.** A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

**Genesis, soil.** The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

**Gleyed soil.** A soil having one or more neutral gray horizons as a result of waterlogging and lack of oxygen. The term "gleyed" also designates gray horizons and horizons having yellow and gray mottles as a result of intermittent waterlogging.

**Gully.** A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

**Hardpan.** A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

**Horizon, soil.** A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. The major horizons of mineral soil are as follows:

*O horizon.*—An organic layer, fresh and decaying plant residue, at the surface of a mineral soil.

*A horizon.*—The mineral horizon, formed or forming at or near the surface, in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon most of which was originally part of a B horizon.

*A2 horizon.*—A mineral horizon, mainly a residual concentration of sand and silt high in content of resistant minerals as a result of the loss of silicate clay, iron, aluminum, or a combination of these.

*B horizon.*—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or a combination of these; (2) by prismatic or blocky structure; (3) by redder or browner colors than those in the A horizon; or (4) by a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

*C horizon.*—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that from which the solum is presumed to have formed. If the material is known to differ from that in the solum the Roman numeral II precedes the letter C.

*R layer.*—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

**Liquid limit.** The moisture content at which the soil passes from a plastic to a liquid state.

**Morphology, soil.** The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

**Mottling, soil.** Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few*, *common*, and *many*; size—*fine*, *medium*, and *coarse*; and contrast—*faint*, *distinct*, and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

**Munsell notation.** A designation of color by degrees of the three single variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

**Parent material.** The great variety of unconsolidated organic and mineral material in which soil forms. Consolidated bedrock is not yet parent material by this concept.

**Ped.** An individual natural soil aggregate, such as a granule, a prism, or a block.

**Percs slowly.** The slow movement of water through the soil adversely affecting the specified use.

**Permeability.** The quality that enables the soil to transmit water or air, measured as the number of inches per hour that water moves through the soil. Terms describing permeability are *very slow* (less than 0.06 inch), *slow* (0.06 to 0.20 inch), *moderately slow* (0.2 to 0.6 inch), *moderate* (0.6 to 2.0 inches), *moderately rapid* (2.0 to 6.0 inches), *rapid* (6.0 to 20 inches), and *very rapid* (more than 20 inches).

**pH value.** (See Reaction, soil). A numerical designation of acidity and alkalinity in soil.

**Piping.** Moving water forms subsurface tunnels or pipelike cavities in the soil.

**Plasticity index.** The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

**Plastic limit.** The moisture content at which a soil changes from a semisolid to a plastic state.

**Plowpan.** A compacted layer formed in the soil directly below the plowed layer.

**Profile, soil.** A vertical section of the soil extending through all its horizons and into the parent material.

**Reaction, soil.** The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

| | *pH* |
|---|---|
| Extremely acid | Below 4.5 |
| Very strongly acid | 4.5 to 5.0 |
| Strongly acid | 5.1 to 5.5 |
| Medium acid | 5.6 to 6.0 |
| Slightly acid | 6.1 to 6.5 |
| Neutral | 6.6 to 7.3 |
| Mildly alkaline | 7.4 to 7.8 |
| Moderately alkaline | 7.9 to 8.4 |
| Strongly alkaline | 8.5 to 9.0 |
| Very strongly alkaline | 9.1 and higher |

**Relief.** The elevations or inequalities of a land surface, considered collectively.

**Rill.** A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

**Sand.** As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

**Seepage.** The rapid movement of water through the soil. Seepage adversely affects the specified use.

**Series, soil.** A group of soils, formed from a particular type of parent material, having horizons that, except for the texture of the A or surface horizon, are similar in all profile characteristics and in ar-

rangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineralogical and chemical composition.

**Shrink-swell.** The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

**Silt.** As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

**Site index.** A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

**Slickensides.** Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

**Slow intake.** The slow movement of water into the soil.

**Soil.** A natural, three-dimensional body at the earth's surface that is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

**Soil separates.** Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows: *very coarse sand* (2.0 millimeters to 1.0 millimeter); *coarse sand* (1.0 to 0.5 millimeter); *medium sand* (0.5 to 0.25 millimeter); *fine sand* (0.25 to 0.10 millimeter); *very fine sand* (0.10 to 0.05 millimeter); *silt* (0.005 to 0.002 millimeter); and *clay* (less than 0.002 millimeter).

**Solum.** The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in mature soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristics of the soil are largely confined to the solum.

**Structure, soil.** The arrangement of primary soil particles into compound particles or aggregates that are separated from adjoining aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

**Subsoil.** Technically, the B horizon; roughly, the part of the solum below plow depth.

**Subsoiling.** Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

**Substratum.** The part of the soil below the solum.

**Subsurface layer.** Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

**Surface soil.** The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

**Terrace.** An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that it can soak into the soil or flow slowly to a prepared outlet without harm. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

**Texture, soil.** The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt, silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay*, and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

**Thin layer.** Otherwise suitable soil material too thin for the specified use.

**Tilth, soil.** The condition of the soil, especially the soil structure, as related to the growth of plants. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

**Topsoil** (engineering). Presumably a fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

**Unstable fill.** Risk of caving or sloughing in banks of fill material.

**Variant, soil.** A soil having properties sufficiently different from those of other known soils to justify a new series name, but the limited geographic soil area does not justify creation of a new series.

**Water table.** The upper limit of the soil or underlying rock material that is wholly saturated with water.

*Water table, apparent.* A thick zone of free water in the soil. An apparent water table is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

*Water table, artesian.* A water table under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.

*Water table, perched.* A water table standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

## Illustrations

*Figure 1.*—Kudzu protects the sides of a deep field ditch on Cascilla silt loam.

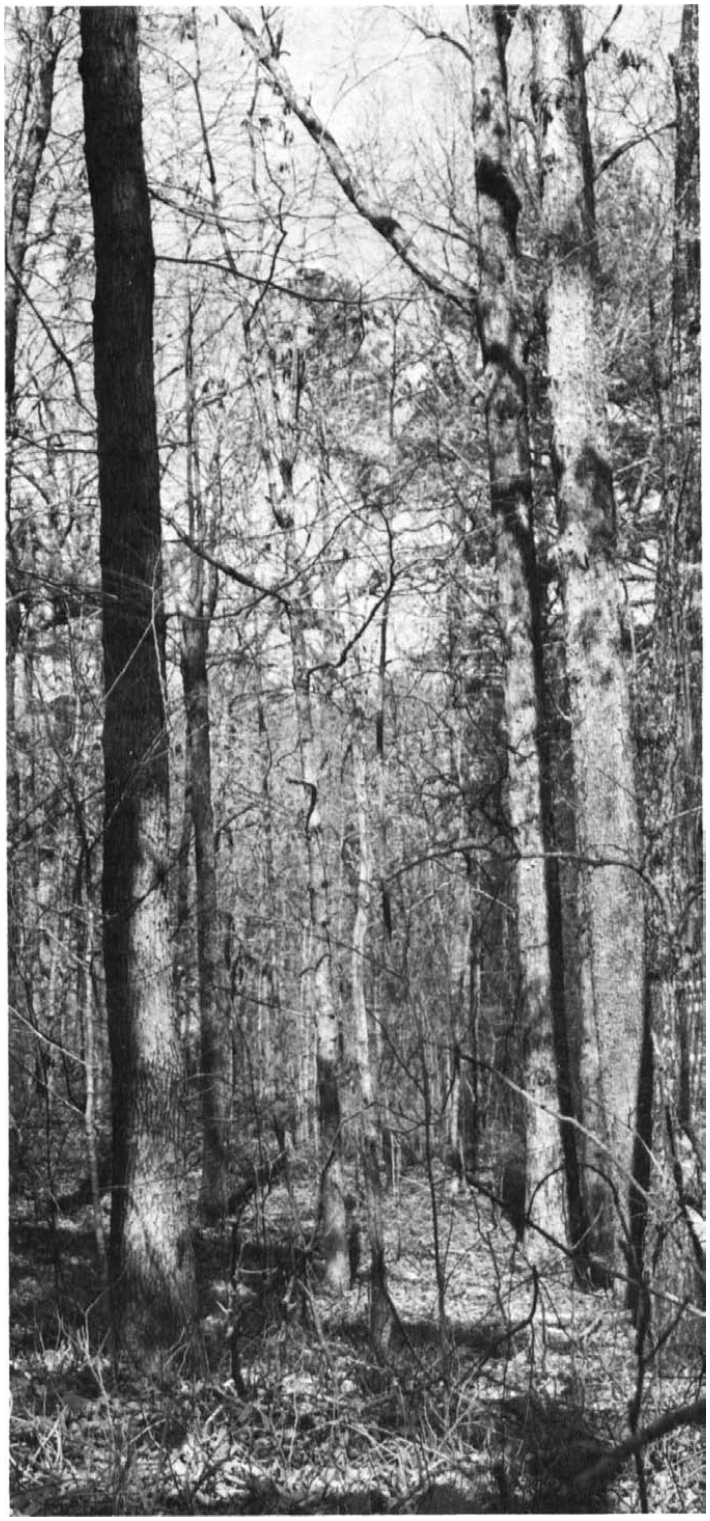

*Figure 2.*—Hardwoods on Maben-Wilcox-Tippah association, hilly.

*Figure 3.*—Hardwoods on Smithdale-Ora association, hilly.

*Figure 4.*—Floodwater-retarding structure on Sweatman-Providence association, hilly.

*Figure 5.*—Recreation lake on Tippah silt loam, 8 to 12 percent slopes, eroded, and Sweatman-Providence association, hilly.

*Figure 6.*—Cattle grazing fescue on Urbo silty clay loam.

*Figure 7.*—Diversion terraces to protect Oaklimeter silt loam from adjacent hillside.

# Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION DATA

| Month | Temperature[1] | | | | | | Precipitation[1] | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Average daily maximum | Average daily minimum | Average highest maximum | Monthly lowest minimum | Mean number of days: Max. 90° F above | Mean number of days: Min. 32° F below | Average total | One year in 10 will have--: Less than-- | One year in 10 will have--: More than-- | Mean snowfall |
| | F | F | F | F | | | In | In | In | In |
| January---- | 53 | 30 | 74 | 9 | 0 | 19 | 4.6 | 1.6 | 8.3 | 0.9 |
| February--- | 58 | 34 | 74 | 16 | 0 | 14 | 5.4 | 2.5 | 8.7 | 0.6 |
| March------ | 64 | 39 | 77 | 22 | 0 | 9 | 5.0 | 2.5 | 8.0 | 0.2 |
| April------ | 75 | 51 | 87 | 33 | 0 | 1 | 6.2 | 3.1 | 9.8 | 0 |
| May-------- | 82 | 58 | 92 | 42 | 3 | 0 | 3.9 | 1.1 | 7.4 | 0 |
| June------- | 88 | 64 | 96 | 51 | 13 | 0 | 3.3 | 1.4 | 5.6 | 0 |
| July------- | 91 | 68 | 98 | 60 | 21 | 0 | 4.5 | 1.8 | 8.3 | 0 |
| August----- | 90 | 67 | 97 | 57 | 18 | 0 | 3.4 | 1.3 | 5.8 | 0 |
| September-- | 87 | 61 | 94 | 47 | 10 | 0 | 3.1 | .8 | 6.1 | 0 |
| October---- | 76 | 49 | 88 | 32 | 1 | 2 | 2.6 | .5 | 2.9 | 0 |
| November--- | 65 | 39 | 81 | 19 | 0 | 8 | 4.2 | 1.2 | 7.9 | 0.1 |
| December--- | 57 | 34 | 74 | 13 | 0 | 14 | 5.7 | 1.9 | 10.5 | 0.5 |
| Year------ | 74 | 49 | 99 | 7 | 66 | 67 | 51.9 | 42.8 | 62.2 | 2.3 |

[1]Data are from Winona, Montgomery County, Mississippi, but are representative of Webster County.

TABLE 2.--PROBABILITIES OF LAST FREEZING TEMPERATURES IN SPRING AND FIRST IN FALL

| Probability | Dates for given probability and temperature[1]: 24 F | 28 F | 32 F | 36 F | 40 F |
|---|---|---|---|---|---|
| Spring: | | | | | |
| 1 year in 10 later than-- | March 28 | April 4 | April 17 | April 23 | May 15 |
| 2 years in 10 later than-- | March 20 | March 29 | April 12 | April 19 | May 9 |
| 5 years in 10 later than-- | March 5 | March 19 | April 4 | April 10 | April 28 |
| Fall: | | | | | |
| 1 year in 10 earlier than- | November 11 | October 27 | October 19 | October 8 | September 29 |
| 2 years in 10 earlier than- | Novemer 15 | November 1 | October 23 | October 12 | October 4 |
| 5 years in 10 earlier than- | November 23 | November 10 | October 31 | October 21 | October 15 |

[1]Data are from Winona, in Montgomery County, Mississippi. Data are representative of Webster County.

TABLE 3.--SPECIFIED USES AND FEATURES AFFECTING

| Soil association | Extent of area | Cultivated farm crops | Pasture | Woodland | Urban use | Recreation |
|---|---|---|---|---|---|---|
| | Pct | | | | | |
| 1. Chenneby-Urbo | 2 | High | High | Very high | Low; wetness, floods. | Low; wetness, floods. |
| 2. Chenneby-Arkabutla | 5 | High | High | Very high | Low; wetness, floods. | Low; wetness, floods. |
| 3. Chenneby-Oaklimeter-Cascilla | 6 | High | High | Very high | Low; wetness, floods. | Low; wetness, floods. |
| 4. Oaklimeter-Ariel | 8 | High | High | Very high | Low; wetness, floods. | Low; wetness, floods. |
| 5. Sweatman-Providence | 31 | Low; slope, erosion. | Low; slope, erosion. | Moderately high. | Low; slope. | Medium; slope. |
| 6. Smithdale-Ora | 30 | Low; slope, erosion. | Low; slope, erosion. | Moderately high. | Low; slope. | Medium; slope. |
| 7. Bude-Guyton-Providence | 2 | High | High | High | Low; wetness, percs slowly. | Medium; wetness, |
| 8. Providence-Tippah | 8 | Medium | High | Moderately high. | Medium; low strength, shrink-swell, percs slowly. | Medium; slope. |
| 9. Wilcox-Maben-Tippah | 8 | Low; slope, erosion. | Low; slope, erosion. | Moderately high. | Low; shrink-swell. | Medium; slope. |

TABLE 4.--APPROXIMATE ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

| Map symbol | Soil name | Acres | Percent |
|---|---|---|---|
| Ae | Ariel silt loam | 2,800 | 1.1 |
| Ak | Arkabutla silt loam | 3,600 | 1.4 |
| Bo | Bonn silt loam | 1,215 | 0.5 |
| Br | Bruno sandy loam | 300 | 0.1 |
| BuA | Bude silt loam, 0 to 2 percent slopes | 5,800 | 2.2 |
| Ca | Cascilla silt loam | 2,400 | 0.9 |
| Ce | Chenneby silt loam | 10,400 | 3.9 |
| CH | Chenneby-Arkabutla association, frequently flooded | 5,250 | 2.0 |
| FaA | Falkner silt loam, 0 to 2 percent slopes | 1,250 | 0.5 |
| FaB | Falkner silt loam, 2 to 5 percent slopes | 1,300 | 0.5 |
| Gu | Guyton silt loam | 3,800 | 1.4 |
| Je | Jena fine sandy loam | 1,550 | 0.6 |
| LoA | Longview silt loam, 0 to 2 percent slopes | 1,900 | 0.7 |
| MaE | Maben loam, 8 to 15 percent slopes | 1,175 | 0.4 |
| MWE | Maben-Wilcox-Tippah association, hilly | 8,000 | 3.0 |
| Oa | Oaklimeter silt loam | 32,475 | 12.1 |
| OrC2 | Ora loam, 5 to 8 percent slopes, eroded | 1,075 | 0.4 |
| OrD2 | Ora loam, 8 to 12 percent slopes, eroded | 3,440 | 1.3 |
| OrD3 | Ora loam, 8 to 12 percent slopes, severely eroded | 2,290 | 0.9 |
| Oz | Ozan silt loam | 480 | 0.2 |
| PnB | Prentiss silt loam, 2 to 5 percent slopes | 220 | 0.1 |
| PoA | Providence silt loam, 0 to 2 percent slopes | 700 | 0.3 |
| PoB2 | Providence silt loam, 2 to 5 percent slopes, eroded | 5,090 | 1.9 |
| PoC2 | Providence silt loam, 5 to 8 percent slopes, eroded | 10,800 | 4.1 |
| PoD3 | Providence silt loam, 5 to 12 percent slopes, severely eroded | 3,450 | 1.3 |
| PoD2 | Providence silt loam, 8 to 12 percent slopes, eroded | 6,830 | 2.6 |
| PrE | Providence complex, gullied | 975 | 0.4 |
| SmE | Smithdale sandy loam, 15 to 25 percent slopes | 1,300 | 0.5 |
| SOE | Smithdale-Ora association, hilly | 55,000 | 20.5 |
| StA | Stough fine sandy loam, 0 to 2 percent slopes | 1,600 | 0.6 |
| SuE | Sweatman loam, 15 to 25 percent slopes | 3,600 | 1.4 |
| SvD | Sweatman-Providence complex, 8 to 12 percent slopes | 4,300 | 1.6 |
| SWE | Sweatman-Providence association, hilly | 44,000 | 16.4 |
| TaB2 | Tippah silt loam, 2 to 5 percent slopes, eroded | 2,800 | 1.1 |
| TaC2 | Tippah silt loam, 5 to 8 percent slopes, eroded | 13,600 | 5.1 |
| TaC3 | Tippah silt loam, 5 to 8 percent slopes, severely eroded | 6,300 | 2.4 |
| TaD2 | Tippah silt loam, 8 to 12 percent slopes, eroded | 7,700 | 2.9 |
| Ur | Urbo silty clay loam | 2,525 | 0.9 |
| Ve | Verdun Variant silt loam | 650 | 0.2 |
| WlB2 | Wilcox silty clay loam, 2 to 5 percent slopes, eroded | 1,000 | 0.4 |
| WlC2 | Wilcox silty clay loam, 5 to 12 percent slopes, eroded | 3,300 | 1.2 |
| | Total | 266,240 | 100.0 |

TABLE 5.--ESTIMATED ACRE YIELDS OF CROPS AND PASTURE PLANTS

[All yields were estimated for a high level of management in 1974. Absence of a yield figure indicates the crop is seldom grown or is not suited]

| Soil name and map symbol | Cotton | Corn | Soybeans | Common bermuda-grass | Improved bermuda-grass | Bahiagrass | Tall fescue |
|---|---|---|---|---|---|---|---|
| | Lb | Bu | Bu | AUM[1] | AUM[1] | AUM[1] | AUM[1] |
| Ariel: | | | | | | | |
| Ae | 800 | 110 | 40 | 9.0 | 11.0 | 10.5 | 10.0 |
| Arkabutla: | | | | | | | |
| Ak | 700 | 95 | 35 | 7.0 | 11.0 | 10.0 | 10.0 |
| Bonn: | | | | | | | |
| Bo | --- | --- | 15 | 4.0 | --- | 4.5 | --- |
| Bruno: | | | | | | | |
| Br | 400 | 50 | --- | 5.0 | --- | 6.0 | --- |
| Bude: | | | | | | | |
| BuA | 625 | 85 | 25 | 6.5 | 9.0 | 8.0 | 8.0 |
| Cascilla: | | | | | | | |
| Ca | 850 | 110 | 40 | 9.0 | 12.0 | 11.0 | 10.0 |
| Chenneby: | | | | | | | |
| Ce | 700 | 100 | 35 | 7.0 | 10.0 | 10.0 | 10.0 |
| [2]CH: | | | | | | | |
| Chenneby part | --- | --- | 20 | 6.0 | 10.0 | 9.0 | 9.0 |
| Arkabutla part | --- | --- | 20 | 6.0 | 10.0 | 9.0 | 9.0 |
| Falkner: | | | | | | | |
| FaA | 625 | 75 | 35 | 6.5 | 9.5 | 9.0 | 8.0 |
| FaB | 600 | 70 | 30 | 6.5 | 9.0 | 8.5 | 7.5 |
| Guyton: | | | | | | | |
| [3]Gu | --- | --- | 23 | 6.5 | --- | 9.5 | 6.0 |
| Jena: | | | | | | | |
| Je | 700 | 85 | 35 | 7.0 | 12.0 | 8.5 | 10.0 |
| Longview: | | | | | | | |
| LoA | 650 | 85 | 30 | 8.0 | 9.0 | 8.0 | 8.0 |
| Maben: | | | | | | | |
| MaE | --- | --- | --- | 4.5 | 6.5 | 6.5 | 7.0 |
| [2]MWE: | | | | | | | |
| Maben part | --- | --- | --- | 4.5 | --- | 5.0 | --- |
| Wilcox part | --- | --- | --- | 4.5 | --- | 5.0 | --- |
| Tippah part | 500 | 60 | 25 | 6.5 | 8.5 | 8.0 | 7.0 |
| Oaklimeter: | | | | | | | |
| Oa | 750 | 95 | 40 | 9.0 | 11.0 | 10.0 | 10.0 |
| Ora: | | | | | | | |
| OrC2 | 600 | 70 | 30 | 6.5 | 8.0 | 8.5 | 7.5 |
| OrD2, OrD3 | --- | --- | --- | 6.0 | 7.0 | 8.0 | 7.0 |
| Ozan: | | | | | | | |
| Oz | --- | --- | 20 | 6.0 | --- | 6.5 | 6.0 |
| Prentiss: | | | | | | | |
| PnB | 750 | 80 | 30 | 7.5 | 9.0 | 9.0 | 8.0 |
| Providence: | | | | | | | |
| PoA | 700 | 80 | 35 | 8.0 | 10.0 | 9.0 | 8.5 |

See footnotes at end of table.

TABLE 5.--ESTIMATED ACRE YIELDS OF CROPS AND PASTURE PLANTS--Continued

| Soil name and map symbol | Cotton | Corn | Soybeans | Common bermuda-grass | Improved bermuda-grass | Bahiagrass | Tall fescue |
|---|---|---|---|---|---|---|---|
| | Lb | Bu | Bu | AUM[1] | AUM[1] | AUM[1] | AUM[1] |
| Providence: | | | | | | | |
| PoB2 | 700 | 80 | 35 | 7.5 | 9.5 | 8.5 | 8.5 |
| PoC2 | 650 | 70 | 30 | 7.0 | 9.0 | 8.0 | 7.5 |
| PoD2, PoD3, PrE | --- | --- | --- | 6.5 | 8.5 | 8.0 | 7.0 |
| Smithdale: | | | | | | | |
| SmE | --- | --- | --- | --- | --- | --- | --- |
| [2]SOE: | | | | | | | |
| Smithdale part | --- | --- | --- | --- | --- | --- | --- |
| Ora part | --- | --- | --- | 6.0 | 7.0 | 8.0 | 7.0 |
| Stough: | | | | | | | |
| StA | 725 | 80 | 25 | 6.5 | 8.0 | 8.0 | 8.0 |
| Sweatman: | | | | | | | |
| SuE | --- | --- | --- | 3.5 | --- | 5.0 | --- |
| [2]SvD | --- | --- | --- | 4.0 | --- | 5.5 | --- |
| [2]SWE: | | | | | | | |
| Sweatman part | --- | --- | --- | --- | --- | --- | --- |
| Providence part | --- | --- | --- | 6.5 | 8.5 | 8.0 | 7.0 |
| Tippah: | | | | | | | |
| TaB2 | 650 | 80 | 35 | 7.5 | 10.0 | 9.0 | 8.5 |
| TaC2, TaC3 | 600 | 70 | 30 | 7.0 | 9.0 | 8.5 | 7.5 |
| TaD2 | 500 | 60 | 25 | 6.5 | 8.5 | 8.0 | 7.0 |
| Urbo: | | | | | | | |
| Ur | 700 | 95 | 35 | 8.0 | 12.0 | --- | 11.0 |
| Verdun Variant: | | | | | | | |
| Ve | --- | --- | 20 | 4.5 | --- | 5.0 | --- |
| Wilcox: | | | | | | | |
| WlB2 | --- | 40 | 25 | 6.5 | --- | 8.0 | 7.5 |
| WlC2 | --- | --- | --- | 5.5 | --- | 6.0 | 6.0 |

[1]Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for a period of 30 days.
[2]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.
[3]Yields are for areas protected from flooding.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed in this table. Absence of an entry in a column means the information was not available]

| Soil name and map symbol | Suitability group | Management concerns: Erosion hazard | Management concerns: Equipment limitation | Management concerns: Seedling mortality | Management concerns: Plant competition | Potential productivity: Important trees | Potential productivity: Site index | Trees to plant |
|---|---|---|---|---|---|---|---|---|
| Ariel: | | | | | | | | |
| Ae | 1o7 | Slight | Slight | Slight | Moderate | Cherrybark oak | 110 | Cherrybark oak, |
| | | | | | | Eastern cottonwood | 115 | eastern cottonwood, |
| | | | | | | Loblolly pine | 95 | loblolly pine, |
| | | | | | | Sweetgum | 100 | sweetgum, |
| | | | | | | Water oak | 105 | water oak, |
| | | | | | | Yellow-poplar | 110 | yellow-poplar. |
| Arkabutla: | | | | | | | | |
| Ak | 1w8 | Slight | Moderate | Slight | Moderate | Cherrybark oak | 105 | Cherrybark oak, |
| | | | | | | Eastern cottonwood | 110 | eastern cottonwood, |
| | | | | | | Green ash | 95 | green ash, |
| | | | | | | Loblolly pine | 100 | loblolly pine, |
| | | | | | | Nuttall oak | 110 | sweetgum, |
| | | | | | | Sweetgum | 100 | American sycamore. |
| | | | | | | Water oak | 100 | |
| | | | | | | Willow oak | 100 | |
| Bonn: | | | | | | | | |
| Bo | 5t0 | Slight | Severe | Severe | --------- | Eastern redcedar | --- | Eastern redcedar. |
| Bruno: | | | | | | | | |
| Br | 2s5 | Slight | Moderate | Moderate | Moderate | Cherrybark oak | 116 | Cherrybark oak, |
| | | | | | | Water oak | 105 | Shumard oak, |
| | | | | | | Sweetgum | 110 | chestnut oak, |
| | | | | | | Willow oak | 88 | willow oak, |
| | | | | | | | | sweetgum, |
| | | | | | | | | yellow-poplar. |
| Bude: | | | | | | | | |
| BuA | 2w8 | Slight | Moderate | Slight | Moderate | Cherrybark oak | 90 | Cherrybark oak, |
| | | | | | | Loblolly pine | 90 | Shumard oak, |
| | | | | | | Sweetgum | 90 | loblolly pine, |
| | | | | | | | | sweetgum, |
| | | | | | | | | yellow-poplar. |
| Cascilla: | | | | | | | | |
| Ca | 1o7 | Slight | Sligh | Slight | Moderate | Cherrybark oak | 112 | Cherrybark oak, |
| | | | | | | Eastern cottonwood | 110 | eastern cottonwood, |
| | | | | | | Green ash | 90 | loblolly pine, |
| | | | | | | Loblolly pine | 93 | nuttall oak, |
| | | | | | | Nuttall oak | 114 | sweetgum, |
| | | | | | | Water oak | 104 | American sycamore, |
| | | | | | | Sweetgum | 102 | yellow-poplar. |
| | | | | | | Yellow-poplar | 115 | |
| Chenneby: | | | | | | | | |
| Ce | 1w8 | Slight | Moderate | Moderate | Severe | Loblolly pine | 96 | Loblolly pine, |
| | | | | | | Sweetgum | 100 | yellow-poplar. |
| | | | | | | Water oak | 90 | |
| | | | | | | Yellow-poplar | 105 | |
| [1]CH: | | | | | | | | |
| Chenneby part | 1w9 | Slight | Severe | Moderate | Severe | Loblolly pine | 96 | Loblolly pine, |
| | | | | | | Sweetgum | 100 | yellow-poplar. |
| | | | | | | Water oak | 90 | |
| | | | | | | Yellow-poplar | 105 | |
| Arkabutla part | 1w9 | Slight | Severe | Severe | Severe | Loblolly pine | 100 | Loblolly pine, |
| | | | | | | Sweet gum | 100 | yellow-poplar. |
| | | | | | | Water oak | 100 | |
| | | | | | | Yellow-poplar | 105 | |
| Falkner: | | | | | | | | |
| FaA, FaB | 2w8 | Slight | Moderate | Slight | Moderate | Loblolly pine | 85 | Cherrybark oak, |
| | | | | | | Shortleaf pine | 75 | loblolly pine, |
| | | | | | | Sweetgum | 90 | shortleaf pine, |
| | | | | | | | | sweetgum. |

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

| Soil name and map symbol | Suitability group | Management concerns: Erosion hazard | Management concerns: Equipment limitation | Management concerns: Seedling mortality | Management concerns: Plant competition | Potential productivity: Important trees | Potential productivity: Site index | Trees to plant |
|---|---|---|---|---|---|---|---|---|
| Guyton: | | | | | | | | |
| Gu | 2w9 | Slight | Severe | Moderate | --------- | Loblolly pine | 90 | Loblolly pine, sweetgum. |
| Jena: | | | | | | | | |
| Je | 1o7 | Slight | Slight | Slight | --------- | Loblolly pine | 100 | Loblolly pine, American sycamore, eastern cottonwood. |
| | | | | | | Sweetgum | 90 | |
| | | | | | | Water oak | 80 | |
| Longview: | | | | | | | | |
| LoA | 2w8 | Slight | Moderate | Slight | Moderate | Cherrybark oak | 88 | Cherrybark oak, Shumard oak, loblolly pine, sweetgum, yellow-poplar. |
| | | | | | | Water oak | 82 | |
| | | | | | | Loblolly pine | 86 | |
| | | | | | | Sweetgum | 88 | |
| Maben: | | | | | | | | |
| MaE | 3c2 | Slight | Moderate | Moderate | Slight | Loblolly pine | 83 | Loblolly pine, shortleaf pine. |
| | | | | | | Shortleaf pine | 73 | |
| [1]MWE: | | | | | | | | |
| Maben part | 3c2 | Slight | Moderate | Moderate | Slight | Loblolly pine | 83 | Loblolly pine, shortleaf pine. |
| | | | | | | Shortleaf pine | 73 | |
| Wilcox part | 3c3 | Severe | Moderate | Moderate | Slight | Loblolly pine | 81 | Loblolly pine. |
| | | | | | | Shortleaf pine | 68 | |
| Tippah part | 3o7 | Slight | Slight | Slight | Moderate | Cherrybark oak | 95 | Cherrybark oak, Shumard oak, loblolly pine, sweetgum, yellow-poplar. |
| | | | | | | Shumard oak | 95 | |
| | | | | | | White oak | 80 | |
| | | | | | | Loblolly pine | 78 | |
| | | | | | | Sweetgum | 90 | |
| | | | | | | Yellow-poplar | 90 | |
| Oaklimeter: | | | | | | | | |
| Oa | 1o7 | Slight | Slight | Slight | Moderate | Cherrybark oak | 100 | Cherrybark oak, eastern cottonwood, loblolly pine, nuttall oak, sweetgum, water oak, yellow-poplar. |
| | | | | | | Eastern cottonwood | 100 | |
| | | | | | | Green ash | 90 | |
| | | | | | | Loblolly pine | 90 | |
| | | | | | | Nuttall oak | 100 | |
| | | | | | | Willow oak | 100 | |
| | | | | | | Sweetgum | 100 | |
| Ora: | | | | | | | | |
| OrC2, OrD2, OrD3 | 3o7 | Slight | Slight | Slight | Moderate | Loblolly pine | 83 | Loblolly pine. |
| | | | | | | Shortleaf pine | 69 | |
| | | | | | | Sweetgum | 80 | |
| Ozan: | | | | | | | | |
| Oz | 2w9 | Slight | Severe | Severe | Severe | Loblolly pine | 95 | Loblolly pine, Shumard oak, sweetgum, American sycamore, eastern cottonwood. |
| | | | | | | Sweetgum | 90 | |
| | | | | | | Water oak | 90 | |
| Prentiss: | | | | | | | | |
| PnB | 2o7 | Slight | Slight | Slight | Slight | Loblolly pine | 88 | Loblolly pine. |
| | | | | | | Shortleaf pine | 79 | |
| | | | | | | Sweetgum | 90 | |
| | | | | | | Cherrybark oak | 90 | |
| | | | | | | White oak | 80 | |
| Providence: | | | | | | | | |
| PoA, PoB2, PoC2, PoD3, PoD2, PrE | 3o7 | Slight | Slight | Slight | Slight | Loblolly pine | 84 | Loblolly pine, Shumard oak, sweetgum, yellow-poplar. |
| | | | | | | Shortleaf pine | 64 | |
| | | | | | | Sweetgum | 90 | |

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

| Soil name and map symbol | Suitability group | Management concerns: Erosion hazard | Management concerns: Equipment limitation | Management concerns: Seedling mortality | Management concerns: Plant competition | Potential productivity: Important trees | Potential productivity: Site index | Trees to plant |
|---|---|---|---|---|---|---|---|---|
| Smithdale: | | | | | | | | |
| SmE | 3o1 | Slight | Slight | Slight | Moderate | Loblolly pine | 80 | Loblolly pine. |
| | | | | | | Shortleaf pine | 69 | |
| SOE: | | | | | | | | |
| Smithdale part | 3o1 | Slight | Slight | Slight | Moderate | Loblolly pine | 80 | Loblolly pine. |
| | | | | | | Shortleaf pine | 69 | |
| Ora part | 3o7 | Slight | Slight | Slight | Moderate | Loblolly pine | 83 | Loblolly pine. |
| | | | | | | Shortleaf pine | 69 | |
| | | | | | | Sweetgum | 80 | |
| Stough: | | | | | | | | |
| StA | 2w8 | Slight | Moderate | Slight | Moderate | Cherrybark oak | 85 | Loblolly pine, slash pine, |
| | | | | | | Loblolly pine | 90 | |
| | | | | | | Sweetgum | 85 | |
| | | | | | | Water oak | 80 | |
| Sweatman: | | | | | | | | |
| SuE | 3c2 | Slight | Moderate | Slight | Slight | Loblolly pine | 83 | Loblolly pine, shortleaf pine. |
| | | | | | | Shortleaf pine | 73 | |
| SvD[1]: | | | | | | | | |
| Sweatman part | 3c2 | Slight | Moderate | Slight | Slight | Loblolly pine | 83 | Loblolly pine, shortleaf pine. |
| | | | | | | Shortleaf pine | 73 | |
| Providence part | 3o7 | Slight | Slight | Slight | Slight | Loblolly pine | 84 | Loblolly pine, Shumard oak, sweetgum, yellow-poplar. |
| | | | | | | Shortleaf pine | 64 | |
| | | | | | | Sweetgum | 90 | |
| SWE[1]: | | | | | | | | |
| Sweatman part | 3c2 | Slight | Moderate | Slight | Slight | Loblolly pine | 83 | Loblolly pine, shortleaf pine. |
| | | | | | | Shortleaf pine | 73 | |
| Providence part | 3o7 | Slight | Slight | Slight | Slight | Loblolly pine | 84 | Loblolly pine, Shumard oak, sweetgum, yellow-poplar. |
| | | | | | | Shortleaf pine | 64 | |
| | | | | | | Sweetgum | 90 | |
| Tippah: | | | | | | | | |
| TaB2, TaC2, TaC3, TaD2 | 3o7 | Slight | Slight | Slight | Moderate | Cherrybark oak | 95 | Cherrybark oak, Shumard oak, loblolly pine, sweetgum, yellow-poplar. |
| | | | | | | Shumard oak | 95 | |
| | | | | | | White oak | 80 | |
| | | | | | | Loblolly pine | 78 | |
| | | | | | | Sweetgum | 90 | |
| | | | | | | Yellow-poplar | 90 | |
| Urbo: | | | | | | | | |
| Ur | 1w8 | Slight | Moderate | Slight | Moderate | Green ash | 93 | Eastern cottonwood, loblolly pine, sweetgum, American sycamore, yellow-poplar. |
| | | | | | | Eastern cottonwood | 108 | |
| | | | | | | Cherrybark oak | 99 | |
| | | | | | | Sweetgum | 98 | |
| Verdun: | | | | | | | | |
| Ve | 5t3 | Moderate | Moderate | Severe | Moderate | Loblolly pine | 60 | Loblolly pine. |
| | | | | | | shortleaf pine | 55 | |
| Wilcox: | | | | | | | | |
| WlB2, WlC2 | 3c2 | Slight | Moderate | Moderate | Slight | Loblolly pine | 81 | Loblolly pine. |
| | | | | | | Shortleaf pine | 68 | |

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 7.--RATINGS OF SOILS AS CONSTRUCTION SITES

["Shrink-swell" and other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe"]

| Soil name and map symbol | Shallow excavations | Dwellings without basements | Dwellings with basements | Small commercial buildings | Local roads and streets |
|---|---|---|---|---|---|
| Ariel: | | | | | |
| Ae | Severe: floods. | Severe: floods. | Severe: floods. | Severe: floods. | Severe: floods. |
| Arkabutla: | | | | | |
| Ak | Severe: floods, wetness. | Severe: floods, wetness. | Severe: floods, wetness. | Severe: floods, wetness, corrosive. | Severe: floods, low strength. |
| Bonn: | | | | | |
| Bo | Severe: wetness, cutbanks cave. | Severe: wetness. | Severe: wetness. | Severe: wetness. | Severe: wetness. |
| Bruno: | | | | | |
| Br | Severe: floods, too sandy. | Severe: floods. | Severe: floods. | Severe: floods. | Severe: floods. |
| Bude: | | | | | |
| BuA | Severe: wetness. | Severe: wetness, low strength. | Severe: wetness. | Severe: wetness, corrosive. | Moderate: wetness, low strength. |
| Cascilla: | | | | | |
| Ca | Severe: floods. | Severe: floods. | Severe: floods. | Severe: floods. | Severe: floods. |
| Chenneby: | | | | | |
| Ce | Severe: floods, wetness. | Severe: floods, wetness. | Severe: floods, wetness. | Severe: floods, wetness. | Severe: floods, low strength. |
| [1]CH: | | | | | |
| Chenneby part | Severe: floods, wetness. | Severe: floods, wetness. | Severe: floods, wetness. | Severe: floods, wetness. | Severe: floods, low strength. |
| Arkabutla part | Severe: floods, wetness. | Severe: floods, wetness. | Severe: floods, wetness. | Severe: floods, wetness, corrosive. | Severe: floods, low strength. |
| Falkner: | | | | | |
| FaA, FaB | Severe: wetness. | Severe: wetness, low strength, shrink-swell. | Severe: low strength, shrink-swell, wetness. | Severe: low strength, shrink-swell, wetness. | Severe: low strength, shrink-swell, wetness. |
| Guyton: | | | | | |
| Gu | Severe: wetness, cutbanks cave. | Severe: wetness. | Severe: wetness. | Severe: wetness. | Severe: wetness. |
| Jena: | | | | | |
| Je | Severe: too sandy, cutbanks cave. | Severe: floods. | Severe: floods. | Severe: floods. | Moderate: low strength, floods. |
| Longview: | | | | | |
| LoA | Severe: wetness. | Severe: wetness. | Severe: wetness. | Severe: wetness, corrosive. | Moderate: wetness, shrink-swell. |

See footnotes at end of table.

TABLE 7.--RATINGS OF SOILS AS CONSTRUCTION SITES--Continued

| Soil name and map symbol | Shallow excavations | Dwellings without basements | Dwellings with basements | Small commercial buildings | Local roads and streets |
|---|---|---|---|---|---|
| Maben: | | | | | |
| MaE | Moderate: too clayey, slope. | Severe: shrink-swell, low strength. | Severe: shrink-swell, low strength. | Severe: slope. | Severe: shrink-swell, low strength. |
| [1]MWE: | | | | | |
| Maben part | Severe: too clayey, slope. | Severe: slope, shrink-swell. | Severe: slope, shrink-swell. | Severe: slope. | Severe: slope, shrink-swell. |
| Wilcox part | Severe: wetness, too clayey. | Severe: shrink-swell, low strength. | Severe: shrink-swell, low strength, wetness. | Severe: shrink-swell, low strength. | Severe: shrink-swell, low strength. |
| Tippah part | Severe: too clayey. | Severe: low strength, shrink-swell. | Severe: low strength, shrink-swell. | Severe: low strength, shrink-swell, corrosive. | Severe: low strength, shrink-swell. |
| Oaklimeter: | | | | | |
| Oa | Severe: floods. | Severe: floods, wetness. | Severe: floods, wetness. | Severe: floods, wetness. | Severe: floods. |
| Ora: | | | | | |
| OrC2 | Slight | Moderate: low strength. | Moderate: low strength. | Moderate: low strength, slope. | Moderate: low strength. |
| OrD2, OrD3 | Moderate: slope | Moderate: low strength. | Moderate: low strength. | Severe: slope. | Moderate: low strength. |
| Ozan: | | | | | |
| Oz | Severe: wetness. | Severe: wetness. | Severe: wetness. | Severe: wetness. | Severe: wetness. |
| Prentiss: | | | | | |
| PnB | Severe: wetness. | Moderate: wetness, low strength. | Severe: wetness. | Moderate: wetness, low strength. | Moderate: low strength. |
| Providence: | | | | | |
| PoA, PoB2, PoC2 | Moderate: wetness. | Moderate: low strength. | Moderate: low strength. | Moderate: slope, low strength. | Moderate: low strength. |
| PoD2, PoD3, PrE | Moderate wetness. | Moderate: low strength. | Moderate: low strength. | Severe: slope. | Moderate: low strength. |
| Smithdale: | | | | | |
| SmE | Severe: slope. | Severe: slope. | Severe: slope. | Severe: slope. | Severe: slope. |
| [1]SOE: | | | | | |
| Smithdale part | Severe: slope. | Severe: slope. | Severe: slope. | Severe: slope. | Severe: slope. |
| Ora part | Moderate: slope. | Moderate: low strength. | Moderate: low strength. | Severe: slope. | Moderate: low strength. |
| Stough: | | | | | |
| StA | Severe: wetness. | Severe: wetness. | Severe: wetness. | Severe: wetness. | Moderate: wetness. |
| Sweatman: | | | | | |
| SuE | Severe: slope. | Severe: slope. | Severe: slope. | Severe: slope. | Severe: slope. |

See footnotes at end of table.

TABLE 7.--RATINGS OF SOILS AS CONSTRUCTION SITES--Continued

| Soil name and map symbol | Shallow excavations | Dwellings without basements | Dwellings with basements | Small commercial buildings | Local roads and streets |
|---|---|---|---|---|---|
| Sweatman: | | | | | |
| [1]SvD: | | | | | |
| Sweatman part | Moderate: too clayey, slope. | Moderate: shrink-swell, slope. | Moderate: shrink-swell, slope. | Severe: slope. | Moderate: shrink-swell, slope. |
| Providence part | Moderate: wetness. | Moderate: low strength. | Moderate: low strength. | Severe: slope. | Moderate: low strength. |
| [1]SWE: | | | | | |
| Sweatman part | Severe: slope. | Severe: slope. | Severe: slope. | Severe: slope. | Severe: slope. |
| Providence part | Moderate: wetness. | Moderate: low strength. | Moderate: low strength. | Severe: slope. | Moderate: low strength. |
| Tippah: | | | | | |
| TaB2, TaC2, TaC3, TaD2 | Severe: too clayey. | Severe: low strength, shrink-swell. | Severe: low strength, shrink-swell. | Severe: low strength, shrink-swell, corrosive. | Severe: low strength, shrink-swell. |
| Urbo: | | | | | |
| Ur | Severe: floods, wetness, too clayey. | Severe: floods, wetness, shrink-swell. | Severe: floods, wetness, shrink-swell. | Severe: floods, corrosive, wetness. | Severe: floods, shrink-swell. |
| Verdun Variant: | | | | | |
| Ve | Severe: wetness, cutbanks cave. | Moderate: wetness, shrink-swell, low strength. | Severe: wetness. | Moderate: wetness, shrink-swell, low strength. | Moderate: wetness, shrink-swell, low strength. |
| Wilcox: | | | | | |
| WlB2, WlC2 | Severe: wetness, too clayey. | Severe: shrink-swell, low strength. | Severe: shrink-swell, low strength, wetness. | Severe: shrink-swell, low strength. | Severe: shrink-swell, low strength. |

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 8.--SOIL RATINGS FOR SANITARY FACILITIES

[Terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms used to rate soils]

| Soil name and map symbol | Septic tank absorption fields | Sewage lagoon areas | Trench sanitary landfill | Area sanitary landfill | Daily cover for landfill |
|---|---|---|---|---|---|
| Ariel: | | | | | |
| Ae | Severe: floods, percs slowly. | Severe: floods. | Severe: floods. | Severe: floods. | Good. |
| Arkabutla: | | | | | |
| Ak | Severe: floods, wetness. | Moderate: seepage. | Severe: floods. | Severe: floods. | Fair: too clayey. |
| Bonn: | | | | | |
| Bo | Severe: percs slowly, wetness. | Severe: wetness. | Severe: wetness. | Severe: wetness. | Poor: wetness. |
| Bruno: | | | | | |
| Br | Severe: floods. | Severe: seepage. | Severe: seepage. | Severe: seepage. | Poor: too sandy. |
| Bude: | | | | | |
| BuA | Severe: percs slowly, wetness. | Slight | Moderate: wetness, percs slowly. | Moderate: wetness. | Fair: too clayey. |
| Cascilla: | | | | | |
| Ca | Severe: floods. | Moderate: seepage. | Severe: floods. | Severe: floods. | Good. |
| Chenneby: | | | | | |
| Ce | Severe: floods. | Severe: wetness. | Severe: floods, wetness. | Severe: floods, wetness. | Good. |
| [1]CH: | | | | | |
| Chenneby part | Severe: floods. | Severe: wetness. | Severe: floods, wetness. | Severe: floods, wetness. | Good. |
| Arkabutla part | Severe: floods, wetness. | Moderate: seepage. | Severe: floods. | Severe: floods. | Fair: too clayey. |
| Falkner: | | | | | |
| FaA | Severe: percs slowly, wetness. | Slight | Severe: too clayey, wetness. | Moderate: wetness. | Fair: thin layer. |
| FaB | Severe: percs slowly, wetness. | Moderate: slope. | Severe: too clayey, wetness. | Moderate: wetness. | Fair: thin layer. |
| Guyton: | | | | | |
| Gu | Severe: wetness, percs slowly. | Severe: wetness. | Severe: wetness. | Severe: wetness. | Poor: wetness. |
| Jena: | | | | | |
| Je | Moderate: floods. | Severe: seepage. | Severe: too sandy, seepage. | Severe: seepage. | Good. |
| Longview: | | | | | |
| LoA | Severe: percs slowly, wetness. | Slight | Severe: wetness. | Moderate: wetness. | Good. |

See footnotes at end of table.

TABLE 8.--SOIL RATINGS FOR SANITARY FACILITIES--Continued

| Soil name and map symbol | Septic tank absorption fields | Sewage lagoon areas | Trench sanitary landfill | Area sanitary landfill | Daily cover for landfill |
|---|---|---|---|---|---|
| Maben: | | | | | |
| MaE | Severe: percs slowly. | Severe: slope. | Severe: too clayey. | Moderate: slope. | Poor: too clayey. |
| [1]MWE: | | | | | |
| Maben part | Severe: percs slowly, slope. | Severe: slope. | Severe: too clayey. | Severe: slope. | Poor: too clayey. |
| Wilcox part | Severe: percs slowly. | Severe: slope. | Severe: too clayey. | Severe: slope. | Poor: too clayey. |
| Tippah part | Severe: percs slowly. | Severe: slope. | Severe: too clayey. | Severe: wetness. | Poor: too clayey. |
| Oaklimeter: | | | | | |
| Oa | Severe: floods, wetness. | Moderate: seepage. | Severe: floods, wetness. | Severe: floods, wetness. | Good. |
| Ora: | | | | | |
| OrC2 | Severe: percs slowly. | Moderate: slope. | Slight | Slight | Good. |
| OrD2, OrD3 | Severe: percs slowly. | Severe: slope. | Slight | Moderate: slope. | Good. |
| Ozan: | | | | | |
| Oz | Severe: wetness, percs slowly. | Slight | Severe: wetness. | Severe: wetness. | Poor: wetness. |
| Prentiss: | | | | | |
| PnB | Severe: percs slowly, wetness. | Moderate: slope. | Severe: wetness. | Severe: wetness. | Good. |
| Providence: | | | | | |
| PoA | Severe: percs slowly. | Slight | Moderate: too clayey. | Slight | Fair: too clayey. |
| PoB2, PoC2 | Severe: percs slowly. | Moderate: slope. | Moderate: too clayey. | Slight | Fair: too clayey. |
| PoD2, PoD3, PrE | Severe: percs slowly. | Severe: slope. | Moderate: too clayey. | Moderate: slope. | Fair: too clayey. |
| Smithdale: | | | | | |
| SmE | Severe: slope. | Severe: seepage, slope. | Moderate: slope. | Severe: slope. | Poor: slope. |
| [1]SOE: | | | | | |
| Smithdale part | Severe: slope. | Severe: seepage, slope. | Moderate: slope. | Severe: slope. | Poor: slope. |
| Ora part | Severe: percs slowly. | Severe: slope. | Slight | Moderate: slope. | Good. |
| Stough: | | | | | |
| StA | Severe: percs slowly. | Moderate: seepage. | Moderate: wetness. | Moderate: wetness. | Good. |
| Sweatman: | | | | | |
| SuE | Severe: slope, percs slowly. | Severe: slope. | Moderate: too clayey. | Severe: slope. | Poor: slope, thin layer. |

See footnotes at end of table.

TABLE 8.--SOIL RATINGS FOR SANITARY FACILITIES--Continued

| Soil name and map symbol | Septic tank absorption fields | Sewage lagoon areas | Trench sanitary landfill | Area sanitary landfill | Daily cover for landfill |
|---|---|---|---|---|---|
| Sweatman: | | | | | |
| [1]SvD: | | | | | |
| Sweatman part | Severe: percs slowly. | Severe: slope. | Moderate: too clayey. | Moderate: slope. | Poor: thin layer. |
| Providence part | Severe: percs slowly. | Severe: slope. | Moderate: too clayey. | Moderate: slope. | Fair: too clayey. |
| [1]SWE: | | | | | |
| Sweatman part | Severe: slope, percs slowly. | Severe: slope. | Moderate: too clayey. | Severe: slope. | Poor: slope, thin layer. |
| Providence part | Severe: percs slowly. | Severe: slope. | Moderate: too clayey. | Moderate: slope. | Fair: too clayey. |
| Tippah: | | | | | |
| TaB2, TaC2, TaC3 | Severe: percs slowly. | Moderate: slope. | Severe: too clayey. | Severe: wetness. | Poor: too clayey. |
| TaD2 | Severe: percs slowly. | Severe: slope. | Severe: too clayey. | Severe: wetness. | Poor: too clayey. |
| Urbo: | | | | | |
| Ur | Severe: percs slowly, floods, wetness. | Slight | Severe: too clayey, wetness, floods. | Severe: floods, wetness. | Poor: too clayey, wetness, thin layer. |
| Verdun Variant: | | | | | |
| Ve | Severe: wetness, percs slowly. | Slight | Severe: wetness. | Severe: wetness. | Fair: too clayey. |
| Wilcox: | | | | | |
| WlB2 | Severe: percs slowly. | Moderate: slope. | Severe: too clayey. | Moderate: wetness, slope. | Poor: too clayey. |
| WlC2 | Severe: percs slowly. | Severe: slope. | Severe: too clayey. | Moderate: wetness, slope. | Poor: too clayey. |

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 9.--WATER MANAGEMENT

["Seepage" and other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry means soil was not evaluated]

| Soil name and map symbol | Limitations for-- Pond reservoir areas | Embankments, dikes, and levees | Features affecting-- Drainage | Irrigation | Terraces and diversions | Grassed waterways |
|---|---|---|---|---|---|---|
| Ariel: | | | | | | |
| Ae | Moderate: seepage. | Moderate: piping, unstable fill. | Cutbanks cave, floods. | Floods | Not needed | Not needed. |
| Arkabutla: | | | | | | |
| Ak | Moderate: seepage. | Moderate: piping, low strength. | Cutbanks cave, floods. | Erodes easily, floods. | Not needed | Not needed. |
| Bonn: | | | | | | |
| Bo | Slight | Moderate: piping, erodes easily. | Cutbanks cave, excess alkali, percs slowly. | Droughty, excess alkali, wetness. | Not needed | Droughty, erodes easily, excess alkali. |
| Bruno: | | | | | | |
| Br | Severe: seepage. | Moderate: piping, low strength. | Not needed | --- | Not needed | Droughty. |
| Bude: | | | | | | |
| BuA | Slight | Moderate: low strength, piping. | Cutbanks cave, percs slowly, wetness. | Erodes easily, wetness. | Erodes easily, wetness. | Erodes easily, wetness. |
| Cascilla: | | | | | | |
| Ca | Moderate: seepage. | Moderate: piping, low strength. | Cutbanks cave | Favorable | Not needed | Not needed. |
| Chenneby: | | | | | | |
| Ce | Moderate: seepage. | Moderate: piping. | Floods, wetness. | Floods, wetness. | Not needed | Not needed. |
| [1]CH: | | | | | | |
| Chenneby part | Moderate: seepage. | Moderate: piping. | Floods | Floods | Not needed | Not needed. |
| Arkabutla part | Moderate: seepage. | Moderate: piping, low strength. | Cutbanks cave, floods. | Erodes easily, floods. | Not needed | Not needed. |
| Falkner: | | | | | | |
| FaA | Slight | Moderate: compressible, erodes easily. | Favorable | Slow intake, percs slowly. | Erodes easily, percs slowly. | Erodes easily, percs slowly. |
| FaB | Slight | Moderate: compressible, erodes easily. | Slope | Slow intake, percs slowly. | Erodes easily, percs slowly. | Erodes easily, percs slowly. |
| Guyton: | | | | | | |
| Gu | Slight | Moderate: erodes easily, low strength, compressible. | Cutbanks cave, percs slowly. | Percs slowly | Not needed | Wetness. |
| Jena: | | | | | | |
| Je | Severe: seepage. | Moderate: low strength, seepage, piping. | Not needed | Favorable | Not needed | Not needed. |
| Longview: | | | | | | |
| LoA | Moderate: seepage. | Moderate: piping, erodes easily. | Percs slowly, slope. | Slow intake, erodes easily. | Percs slowly, erodes easily. | Percs slowly, erodes easily. |

See footnotes at end of table.

TABLE 9.--WATER MANAGEMENT--Continued

| Soil name and map symbol | Limitations for-- Pond reservoir areas | Embankments, dikes, and levees | Features affecting-- Drainage | Irrigation | Terraces and diversions | Grassed waterways |
|---|---|---|---|---|---|---|
| Maben: | | | | | | |
| MaE | Moderate: seepage. | Severe: low strength, piping. | Slope | Slow intake, complex slope. | Slope, erodes easily. | Percs slowly, slope. |
| [1]MWE: | | | | | | |
| Maben part | Moderate: seepage. | Severe: low strength, piping. | Slope | Slow intake, complex slope. | Slope, erodes easily. | Percs slowly, slope. |
| Wilcox part | Slight | Moderate: low strength, shrink-swell. | Percs slowly, slope. | Slow intake, slope. | Percs slowly, slope. | Percs slowly, slope. |
| Tippah part | Slight | Moderate: shrink-swell, piping. | Cutbanks cave, percs slowly, slope. | Percs slowly, slope. | Erodes easily, percs slowly, slope. | Erodes easily, percs slowly, slope. |
| Oaklimeter: | | | | | | |
| Oa | Moderate: seepage. | Moderate: piping. | Floods, wetness. | Floods, wetness. | Not needed | Not needed. |
| Ora: | | | | | | |
| OrC2, OrD2, OrD3 | Moderate: seepage. | Moderate: piping. | Percs slowly | Percs slowly | Favorable | Rooting depth. |
| Ozan: | | | | | | |
| Oz | Slight | Moderate: unstable fill, piping, compressible. | Wetness, percs slowly. | Wetness | Wetness | Wetness. |
| Prentiss: | | | | | | |
| PnB | Moderate: seepage. | Moderate: compressible, piping. | Percs slowly, wetness, slope. | Percs slowly, wetness. | Percs slowly, wetness, slope. | Percs slowly, wetness, slope. |
| Providence: | | | | | | |
| PoA, PoB2, PoC2, PoD3, PoD2, PrE | Slight | Moderate: piping, unstable fill. | Cutbanks cave, percs slowly, slope. | Erodes easily, percs slowly, slope. | Erodes easily, percs slowly, piping. | Erodes easily, percs slowly, slope. |
| Smithdale: | | | | | | |
| SmE | Severe: seepage. | Moderate: piping, unstable fill. | Not needed, slope. | Fast intake, seepage, complex slope. | Slope, erodes easily. | Slope, erodes easily. |
| [1]SOE: | | | | | | |
| Smithdale part | Severe: seepage. | Moderate: piping, unstable fill. | Not needed, slope. | Fast intake, seepage, complex slope. | Slope, erodes easily. | Slope, erodes easily. |
| Ora part | Moderate: seepage. | Moderate: piping. | Percs slowly | Percs slowly | Favorable | Rooting depth. |
| Stough: | | | | | | |
| StA | Moderate: seepage. | Moderate: piping, low strength. | Percs slowly, wetness, slope. | Percs slowly, wetness. | Percs slowly, wetness. | Percs slowly, wetness. |
| Sweatman: | | | | | | |
| SuE | Moderate: seepage. | Moderate: low strength. | Complex slope | Complex slope, erodes easily. | Slope, erodes easily. | Slope, erodes easily. |
| [1]SvD: | | | | | | |
| Sweatman part | Moderate: seepage. | Moderate: low strength. | Complex slope | Complex slope, erodes easily. | Slope, erodes easily. | Slope, erodes easily. |
| Providence part | Slight | Moderate: piping, unstable fill. | Cutbanks cave, percs slowly, slope. | Erodes easily, percs slowly, slope. | Erodes easily, percs slowly, piping. | Erodes easily, percs slowly, slope. |

See footnotes at end of table.

TABLE 9.--WATER MANAGEMENT--Continued

| Soil name and map symbol | Limitations for-- Pond reservoir areas | Limitations for-- Embankments, dikes, and levees | Features affecting-- Drainage | Features affecting-- Irrigation | Features affecting-- Terraces and diversions | Features affecting-- Grassed waterways |
|---|---|---|---|---|---|---|
| Sweatman: | | | | | | |
| [1]SWE: | | | | | | |
| Sweatman part--- | Moderate: seepage. | Moderate: low strength. | Complex slope-- | Complex slope, erodes easily. | Slope, erodes easily. | Slope, erodes easily. |
| Providence part- | Slight--------- | Moderate: piping, unstable fill. | Cutbanks cave, percs slowly, slope. | Erodes easily, percs slowly, slope. | Erodes easily, percs slowly, piping. | Erodes easily, percs slowly, slope. |
| Tippah: | | | | | | |
| TaB2, TaC2, TaC3, TaD2------------- | Slight--------- | Moderate: shrink-swell, piping. | Cutbanks cave, percs slowly, slope. | Percs slowly, slope. | Erodes easily, percs slowly, slope. | Erodes easily, percs slowly, slope. |
| Urbo: | | | | | | |
| Ur--------------- | Slight--------- | Moderate: compressible, low strength. | Floods, percs slowly, wetness. | Slow intake, wetness. | Not needed----- | Not needed. |
| Verdun Variant: | | | | | | |
| Ve--------------- | Slight--------- | Severe: piping, low strength, erodes easily. | Percs slowly--- | Excess alkali, slow intake. | Not needed----- | Erodes easily, excess alkali. |
| Wilcox: | | | | | | |
| WlB2, WlC2------- | Slight--------- | Moderate: low strength, shrink-swell. | Percs slowly, slope. | Slow intake, slope. | Percs slowly, slope. | Percs slowly, slope. |

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 10.--RATINGS OF SOILS AS SOURCES OF CONSTRUCTION MATERIAL

["Shrink-swell" and other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and "poor"]

| Soil name and map symbol | Road fill | Sand | Gravel | Topsoil |
|---|---|---|---|---|
| Ariel: | | | | |
| Ae | Fair: low strength. | Unsuited: excess fines. | Unsuited: excess fines. | Good. |
| Arkabutla: | | | | |
| Ak | Poor: low strength. | Unsuited: excess fines. | Unsuited: excess fines. | Fair: too clayey. |
| Bonn: | | | | |
| Bo | Poor: wetness, low strength. | Unsuited: excess fines. | Unsuited: excess fines. | Poor: wetness, excess alkali. |
| Bruno: | | | | |
| Br | Good | Fair: excess fines. | Unsuited: excess fines. | Poor: too sandy. |
| Bude: | | | | |
| BuA | Fair: wetness, low strength. | Unsuited: excess fines. | Unsuited: excess fines. | Fair: too clayey. |
| Cascilla: | | | | |
| Ca | Fair: low strength. | Unsuited: excess fines. | Unsuited: excess fines. | Good. |
| Chenneby: | | | | |
| Ce | Fair: wetness, low strength. | Poor: excess fines. | Poor: excess fines. | Good. |
| [1]CH: | | | | |
| Chenneby part | Fair: wetness, low strength. | Poor: excess fines. | Poor: excess fines. | Good. |
| Arkabutla part | Poor: low strength. | Unsuited: excess fines. | Unsuited: excess fines. | Fair: too clayey. |
| Falkner: | | | | |
| FaA, FaB | Poor: low strength, shrink-swell. | Unsuited: excess fines. | Unsuited: excess fines. | Fair: too clayey. |
| Guyton: | | | | |
| Gu | Poor: wetness. | Unsuited: excess fines. | Unsuited: excess fines. | Poor: wetness. |
| Jena: | | | | |
| Je | Fair: low strength. | Poor: excess fines. | Unsuited: excess fines. | Good. |
| Longview: | | | | |
| LoA | Fair: wetness, shrink-swell, low strength. | Unsuited: excess fines. | Unsuited: excess fines. | Good. |
| Maben: | | | | |
| MaE | Poor: shrink-swell, low strength. | Unsuited: excess fines. | Unsuited: excess fines. | Poor: too clayey. |

See footnotes at end of table.

TABLE 10.--RATINGS OF SOILS AS SOURCES OF CONSTRUCTION MATERIAL--Continued

| Soil name and map symbol | Road fill | Sand | Gravel | Topsoil |
|---|---|---|---|---|
| Maben: | | | | |
| [1]MWE: | | | | |
| Maben part | Poor: shrink-swell, low strength. | Unsuited: excess fines. | Unsuited: excess fines. | Poor: too clayey. |
| Wilcox part | Poor: shrink-swell, low strength. | Unsuited: excess fines. | Unsuited: excess fines. | Poor: too clayey. |
| Tippah part | Poor: shrink-swell, low strength. | Unsuited: excess fines. | Unsuited: excess fines. | Fair: too clayey. |
| Oaklimeter: | | | | |
| Oa | Fair: low strength. | Unsuited: excess fines. | Unsuited: excess fines. | Good. |
| Ora: | | | | |
| OrC2, OrD2, OrD3 | Fair: low strength. | Unsuited: excess fines. | Unsuited: excess fines. | Fair: too clayey. |
| Ozan: | | | | |
| Oz | Poor: wetness. | Poor: excess fines. | Unsuited: excess fines. | Poor: wetness. |
| Prentiss: | | | | |
| PnB | Fair: low strength. | Unsuited: excess fines. | Unsuited: excess fines. | Good. |
| Providence: | | | | |
| PoA, PoB2, PoC2, PoD3, PoD2, PrE | Fair: low strength. | Unsuited: excess fines. | Unsuited: excess fines. | Fair: too clayey. |
| Smithdale: | | | | |
| SmE | Fair: slope. | Unsuited: excess fines. | Unsuited: excess fines. | Poor: slope. |
| [1]SOE: | | | | |
| Smithdale part | Fair: slope. | Unsuited: excess fines. | Unsuited: excess fines. | Poor: slope. |
| Ora part | Fair: low strength. | Unsuited: excess fines. | Unsuited: excess fines. | Fair: too clayey. |
| Stough: | | | | |
| StA | Fair: wetness, low strength. | Unsuited: excess fines. | Unsuited: excess fines. | Good. |
| Sweatman: | | | | |
| SuE | Fair: shrink-swell, slope. | Unsuited: excess fines. | Unsuited: excess fines. | Poor: thin layer. |
| [1]SvD: | | | | |
| Sweatman part | Fair: shrink-swell. | Unsuited: excess fines. | Unsuited: excess fines. | Poor: thin layer. |
| Providence part | Fair: low strength. | Unsuited: excess fines. | Unsuited: excess fines. | Fair: too clayey. |
| [1]SWE: | | | | |
| Sweatman part | Fair: shrink-swell, slope. | Unsuited: excess fines. | Unsuited: excess fines. | Poor: thin layer. |
| Providence part | Fair: low strength. | Unsuited: excess fines. | Unsuited: excess fines. | Fair: too clayey. |

See footnotes at end of table.

TABLE 10.--RATINGS OF SOILS AS SOURCES OF CONSTRUCTION MATERIAL--Continued

| Soil name and map symbol | Road fill | Sand | Gravel | Topsoil |
|---|---|---|---|---|
| Tippah: | | | | |
| TaB2, TaC2, TaC3, TaD2 | Poor: shrink-swell, low strength. | Unsuited: excess fines. | Unsuited: excess fines. | Fair: too clayey. |
| Urbo: | | | | |
| Ur | Poor: shrink-swell, wetness. | Unsuited: excess fines. | Unsuited: excess fines. | Fair: wetness, too clayey. |
| Verdun Variant: | | | | |
| Ve | Fair: low strength, shrink-swell, wetness. | Unsuited: excess fines. | Unsuited: excess fines. | Poor: thin layer, excess alkali. |
| Wilcox: | | | | |
| W1B2, W1C2 | Poor: shrink-swell, low strength. | Unsuited: excess fines. | Unsuited: excess fines. | Poor: too clayey. |

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 11.--SOIL RATINGS FOR RECREATIONAL DEVELOPMENT

[Terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe"]

| Soil name and map symbol | Camp areas | Picnic areas | Playgrounds | Paths and trails |
|---|---|---|---|---|
| Ariel: | | | | |
| Ae | Severe: floods. | Moderate: floods. | Severe: floods. | Slight. |
| Arkabutla: | | | | |
| Ak | Severe: floods, wetness. | Moderate: floods, wetness. | Severe: floods, wetness. | Moderate: floods, wetness. |
| Bonn: | | | | |
| Bo | Severe: wetness, percs slowly. | Severe: wetness. | Severe: wetness, percs slowly. | Severe: wetness. |
| Bruno: | | | | |
| Br | Severe: floods. | Moderate: too sandy, floods. | Severe: floods. | Slight. |
| Bude: | | | | |
| BuA | Moderate: wetness, percs slowly. | Moderate: wetness. | Moderate: wetness, percs slowly. | Moderate: wetness. |
| Cascilla: | | | | |
| Ca | Severe: floods. | Moderate: floods. | Severe: floods. | Slight. |
| Chenneby: | | | | |
| Ce | Severe: floods, wetness. | Moderate: floods, wetness. | Severe: floods, wetness. | Moderate: floods, wetness. |
| [1]CH: | | | | |
| Chenneby part | Severe: floods, wetness. | Moderate: floods, wetness. | Severe: floods, wetness. | Moderate: floods, wetness. |
| Arkabutla part | Severe: floods, wetness. | Moderate: floods, wetness. | Severe: floods, wetness. | Moderate: floods, wetness. |
| Falkner: | | | | |
| FaA, FaB | Moderate: wetness, percs slowly. | Moderate: wetness. | Moderate: wetness, percs slowly. | Moderate: wetness. |
| Guyton: | | | | |
| Gu | Severe: wetness. | Severe: wetness. | Severe: wetness. | Severe: wetness. |
| Jena: | | | | |
| Je | Severe: floods. | Moderate: floods. | Severe: floods. | Slight. |
| Longview: | | | | |
| LoA | Moderate: wetness, percs slowly. | Moderate: wetness. | Moderate: wetness, percs slowly. | Moderate: wetness. |
| Maben: | | | | |
| MaE | Moderate: slope. | Moderate: slope. | Severe: slope. | Slight. |
| [1]MWE: | | | | |
| Maben part | Severe: slope. | Severe: slope. | Severe: slope. | Moderate: slope. |

See footnotes at end of table.

TABLE 11.--SOIL RATINGS FOR RECREATIONAL DEVELOPMENT--Continued

| Soil name and map symbol | Camp areas | Picnic areas | Playgrounds | Paths and trails |
|---|---|---|---|---|
| Maben: | | | | |
| Wilcox part | Severe: percs slowly. | Severe: slope, too clayey. | Severe: percs slowly. | Moderate: wetness, too clayey. |
| Tippah part | Moderate: percs slowly. | Moderate: slope. | Severe: slope. | Slight. |
| Oaklimeter: | | | | |
| Oa | Severe: floods, wetness. | Moderate: floods, wetness. | Severe: floods. | Slight. |
| Ora: | | | | |
| OrC2 | Slight | Slight | Severe: slope. | Slight. |
| OrD2, OrD3 | Moderate: slope. | Moderate: slope. | Severe: slope. | Slight. |
| Ozan: | | | | |
| Oz | Severe: wetness. | Severe: wetness. | Severe: wetness. | Severe: wetness. |
| Prentiss: | | | | |
| PnB | Slight | Slight | Moderate: slope. | Slight. |
| Providence: | | | | |
| PoA | Slight | Slight | Slight | Slight. |
| PoB2 | Slight | Slight | Moderate: slope. | Slight. |
| PoC2 | Slight | Slight | Severe: slope. | Slight. |
| PoD2, PoD3, PrE | Moderate: slope. | Moderate: slope. | Severe: slope. | Slight. |
| Smithdale: | | | | |
| SmE | Severe: slope. | Severe: slope. | Severe: slope. | Moderate: slope. |
| [1]SOE: | | | | |
| Smithdale part | Severe: slope. | Severe: slope. | Severe: slope. | Moderate: slope. |
| Ora part | Moderate: slope. | Moderate: slope. | Severe: slope. | Slight. |
| Stough: | | | | |
| StA | Severe: wetness. | Moderate: wetness. | Severe: wetness. | Moderate: wetness. |
| Sweatman: | | | | |
| SuE | Severe: slope. | Severe: slope. | Severe: slope. | Moderate: slope. |
| [1]SvD: | | | | |
| Sweatman part | Moderate: percs slowly, slope. | Moderate: slope. | Severe: slope. | Slight. |
| Providence part | Moderate: slope. | Moderate: slope. | Severe: slope. | Slight. |
| [1]SWE: | | | | |
| Sweatman part | Severe: slope. | Severe: slope. | Severe: slope. | Moderate: slope. |

See footnotes at end of table.

TABLE 11.--SOIL RATINGS FOR RECREATIONAL DEVELOPMENT--Continued

| Soil name and map symbol | Camp areas | Picnic areas | Playgrounds | Paths and trails |
|---|---|---|---|---|
| Sweatman: | | | | |
| Providence part----- | Moderate: slope. | Moderate: slope. | Severe: slope. | Slight. |
| Tippah: | | | | |
| TaB2------------------ | Moderate: percs slowly. | Slight---------------- | Moderate: percs slowly, slope. | Slight. |
| TaC2, TaC3----------- | Moderate: percs slowly. | Slight---------------- | Severe: slope. | Slight. |
| TaD2------------------ | Moderate: percs slowly. | Moderate: slope. | Severe: slope. | Slight. |
| Urbo: | | | | |
| Ur-------------------- | Severe: floods, wetness, percs slowly. | Moderate: wetness, floods, too clayey. | Severe: floods, percs slowly, wetness. | Moderate: wetness, floods, too clayey. |
| Verdun Variant: | | | | |
| Ve-------------------- | Moderate: wetness, percs slowly. | Moderate: wetness. | Moderate: wetness, percs slowly. | Moderate: wetness. |
| Wilcox: | | | | |
| WlB2, WlC2----------- | Severe: percs slowly. | Moderate: wetness, slope, too clayey. | Severe: percs slowly. | Moderate: wetness, too clayey. |

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 12.--SOIL RATINGS FOR WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates the soil was not rated]

| Soil name and map symbol | Potential for habitat elements | | | | | | | | Potential as habitat for-- | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Grain and seed crops | Grasses and legumes | Wild herbaceous plants | Hardwood trees | Coniferous plants | Shrubs | Wetland plants | Shallow water areas | Openland wildlife | Woodland wildlife | Wetland wildlife |
| Ariel: | | | | | | | | | | | |
| Ae | Good | Good | Good | Good | Good | --- | Poor | Very poor. | Good | Good | Very poor. |
| Arkabutla: | | | | | | | | | | | |
| Ak | Fair | Good | Good | Good | Good | --- | Fair | Fair | Good | Good | Fair |
| Bonn: | | | | | | | | | | | |
| Bo | Poor | Poor | Poor | Poor | Poor | --- | Poor | Good | Poor | Poor | Fair |
| Bruno: | | | | | | | | | | | |
| Br | Poor | Poor | Fair | Poor | Poor | Poor | Very poor. | Very poor. | Poor | Poor | Very poor. |
| Bude: | | | | | | | | | | | |
| BuA | Fair | Good | Good | Good | Good | --- | Fair | Fair | Good | Good | Fair |
| Cascilla: | | | | | | | | | | | |
| Ca | Good | Good | Good | Good | Good | --- | Poor | Very poor. | Good | Good | Very poor. |
| Chenneby: | | | | | | | | | | | |
| Ce | Fair | Good | Good | Good | Good | --- | Fair | Fair | Good | Good | Fair |
| [1]CH: | | | | | | | | | | | |
| Chenneby part | Poor | Fair | Fair | Good | Good | --- | Fair | Fair | Fair | Good | Fair |
| Arkabutla part | Poor | Fair | Fair | Good | Good | --- | Fair | Fair | Fair | Good | Fair |
| Falkner: | | | | | | | | | | | |
| FaA | Good | Good | Good | Good | Good | Good | Fair | Fair | Good | Good | Fair |
| FaB | Good | Good | Good | Good | Good | Good | Poor | Very poor. | Good | Good | Very poor. |
| Guyton: | | | | | | | | | | | |
| Gu | Fair | Fair | Fair | Fair | Fair | --- | Good | Good | Fair | Fair | Good |
| Jena: | | | | | | | | | | | |
| Je | Good | Good | Good | Good | Good | --- | Poor | Very poor. | Good | Good | Very poor. |
| Longview: | | | | | | | | | | | |
| LoA | Fair | Good | Good | Good | Good | --- | Fair | Fair | Good | Good | Fair |
| Maben: | | | | | | | | | | | |
| MaE | Fair | Good | Good | Good | Good | --- | Poor | Very poor. | Good | Good | Very poor. |
| [1]MWE: | | | | | | | | | | | |
| Maben part | Poor | Fair | Fair | Good | Good | --- | Very poor. | Very poor. | Fair | Good | Very poor. |
| Wilcox part | Poor | Fair | Good | Good | Good | --- | Very poor. | Very poor. | Fair | Good | Very poor. |
| Tippah part | Fair | Good | Good | Good | Good | --- | Very poor. | Very poor. | Good | Good | Very poor. |
| Oaklimeter: | | | | | | | | | | | |
| Oa | Good | Good | Good | Good | Poor | --- | Poor | Poor | Good | Good | Poor |
| Ora: | | | | | | | | | | | |
| OrC2, OrD2, OrD3 | Fair | Good | Good | Good | Good | --- | Very poor. | Very poor. | Good | Good | Very poor. |

See footnotes at end of table.

TABLE 12.--SOIL RATINGS FOR WILDLIFE HABITAT--Continued

| Soil name and map symbol | Potential for habitat elements: Grain and seed crops | Grasses and legumes | Wild herbaceous plants | Hardwood trees | Coniferous plants | Shrubs | Wetland plants | Shallow water areas | Potential as habitat for--: Openland wildlife | Woodland wildlife | Wetland wildlife |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ozan: | | | | | | | | | | | |
| Oz | Poor | Fair | Fair | Fair | Fair | --- | Good | Good | Fair | Fair | Good |
| Prentiss: | | | | | | | | | | | |
| PnB | Fair | Good | Good | Good | Good | Good | Poor | Poor | Good | Good | Poor |
| Providence: | | | | | | | | | | | |
| PoA, PoB2 | Good | Good | Good | Good | Good | --- | Poor | Very poor. | Good | Good | Very poor. |
| PoC2, PoD3, PoD2, PrE | Fair | Good | Good | Good | Good | --- | Poor | Very poor. | Good | Good | Very poor. |
| Smithdale: | | | | | | | | | | | |
| SmE | Poor | Fair | Good | Good | Good | --- | Very poor. | Very poor. | Fair | Good | Very poor. |
| [1]SOE: | | | | | | | | | | | |
| Smithdale part | Poor | Fair | Good | Good | Good | --- | Very poor. | Very poor. | Fair | Good | Very poor. |
| Ora part | Fair | Good | Good | Good | Good | --- | Very poor. | Very poor. | Good | Good | Very poor. |
| Stough: | | | | | | | | | | | |
| StA | Fair | Good | Good | Good | Good | --- | Fair | Fair | Good | Good | Fair |
| Sweatman: | | | | | | | | | | | |
| SuE | Poor | Fair | Good | Good | Good | --- | Very poor. | Very poor. | Fair | Good | Very poor. |
| [1]SvD: | | | | | | | | | | | |
| Sweatman part | Fair | Good | Good | Good | Good | --- | Poor | Very poor. | Good | Good | Very poor. |
| Providence part | Fair | Good | Good | Good | Good | --- | Poor | Very poor. | Good | Good | Very poor. |
| [1]SWE: | | | | | | | | | | | |
| Sweatman part | Poor | Fair | Good | Good | Good | --- | Very poor. | Very poor. | Fair | Good | Very poor. |
| Providence part | Fair | Good | Good | Good | Good | --- | Poor | Very poor. | Good | Good | Very poor. |
| Tippah: | | | | | | | | | | | |
| TaB2 | Good | Good | Good | Good | Good | --- | Poor | Poor | Good | Good | Poor |
| TaC2, TaC3, TaD2 | Fair | Good | Good | Good | Good | --- | Very poor. | Very poor. | Good | Good | Very poor. |
| Urbo: | | | | | | | | | | | |
| Ur | Fair | Good | Fair | Good | Good | Good | Good | Good | Fair | Good | Good |
| Verdun Variant: | | | | | | | | | | | |
| Ve | Poor | Fair | Fair | --- | Poor | --- | Fair | Fair | Fair | Poor | Fair |
| Wilcox: | | | | | | | | | | | |
| WlB2 | Fair | Good | Good | Good | Good | --- | Fair | Poor | Good | Good | Poor |
| WlC2 | Poor | Fair | Good | Good | Good | --- | Very poor. | Very poor. | Fair | Good | Very poor. |

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 13.--ESTIMATED ENGINEERING PROPERTIES AND CLASSIFICATIONS

[The symbol < means less than; > means greater than. Absence of an entry means data were not estimated]

| Soil name and map symbol | Depth | USDA texture | Classification | | Fragments > 3 inches | Percentage passing sieve number-- | | | | Liquid limit | Plasticity index |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Unified | AASHTO | | 4 | 10 | 40 | 200 | | |
| | In | | | | Pct | | | | | Pct | |
| Ariel: | | | | | | | | | | | |
| Ae | 0-30 | Silt loam | ML, CL-ML | A-4 | 0 | 100 | 100 | 90-100 | 85-95 | <30 | NP-7 |
| | 30-65 | Silt loam, loam | ML, CL, CL-ML | A-4 | 0 | 100 | 100 | 85-100 | 70-90 | <30 | NP-10 |
| Arkabutla: | | | | | | | | | | | |
| Ak | 0-6 | Silt loam | CL, CL-ML | A-4, A-6 | 0 | 100 | 100 | 85-100 | 80-95 | 25-35 | 7-15 |
| | 6-60 | Silty clay loam, silt loam. | CL | A-6, A-7 | 0 | 100 | 100 | 85-100 | 70-90 | 30-45 | 12-25 |
| Bonn: | | | | | | | | | | | |
| Bo | 0-5 | Silt loam | ML, CL-ML | A-4 | 0 | 100 | 100 | 95-100 | 75-100 | 20-30 | 2-7 |
| | 5-20 | Silt loam, silty clay loam. | CL | A-6 | 0 | 95-100 | 90-100 | 85-100 | 65-100 | 30-40 | 12-22 |
| | 20-70 | Silt loam, silty clay loam. | CL, ML | A-6, A-4 | 0 | 100 | 95-100 | 90-100 | 75-100 | 28-38 | 8-18 |
| Bruno: | | | | | | | | | | | |
| Br | 0-7 | Sandy loam | SM, ML | A-2, A-4 | 0 | 100 | 100 | 60-85 | 30-60 | <25 | NP-3 |
| | 7-31 | Sand, sandy loam loamy sand. | SP-SM, SM | A-2, A-4 | 0 | 100 | 100 | 60-80 | 10-40 | --- | NP |
| | 31-62 | Sand | SP-SM, SM | A-2, A-3 | 0 | 100 | 100 | 50-70 | 5-20 | --- | NP |
| Bude: | | | | | | | | | | | |
| BuA | 0-16 | Silt loam | CL | A-6 | 0 | 100 | 100 | 95-100 | 85-96 | 30-40 | 11-25 |
| | 16-32 | Silt loam, silty clay loam. | CL | A-6, A-7 | 0 | 100 | 100 | 95-100 | 84-98 | 35-50 | 15-30 |
| | 32-72 | Silt loam, clay loam, silty clay loam. | CL, CH | A-7, A-6 | 0 | 100 | 100 | 95-100 | 75-90 | 35-65 | 15-40 |
| Cascilla: | | | | | | | | | | | |
| Ca | 0-60 | Silt loam | CL, CL-ML | A-4 | 0 | 100 | 100 | 95-100 | 85-95 | 20-30 | 5-10 |
| Chenneby: | | | | | | | | | | | |
| Ce | 0-7 | Silt loam | CL-ML, ML | A-4 | 0 | 100 | 95-100 | 90-100 | 75-95 | 20-35 | 4-8 |
| | 7-60 | Silt loam, silty clay loam | CL | A-6 | 0 | 100 | 95-100 | 90-100 | 85-95 | 20-35 | 12-20 |
| [1]CH: | | | | | | | | | | | |
| Chenneby part | 0-7 | Silt loam | CL-ML, ML | A-4 | 0 | 100 | 95-100 | 90-100 | 75-95 | 20-35 | 4-8 |
| | 7-60 | Silt loam, silty clay loam. | CL | A-6 | 0 | 100 | 95-100 | 90-100 | 85-95 | 20-35 | 12-20 |
| Arkabutla part | 0-6 | Silt loam | CL, CL-ML | A-4, A-6 | 0 | 100 | 100 | 85-100 | 80-95 | 25-35 | 7-15 |
| | 6-60 | Silty clay loam, silt loam. | CL | A-6, A-7 | 0 | 100 | 100 | 85-100 | 70-90 | 30-45 | 12-25 |
| Falkner: | | | | | | | | | | | |
| FaA, FaB | 0-6 | Silt loam | ML, CL-ML | A-4 | 0 | 100 | 100 | 95-100 | 90-100 | 20-30 | 5-10 |
| | 6-33 | Silt loam, silty clay loam. | CL | A-6, A-7 | 0 | 100 | 100 | 95-100 | 85-95 | 30-45 | 15-30 |
| | 33-75 | Silty clay, clay, silt loam. | CH | A-7 | 0 | 100 | 100 | 90-100 | 85-96 | 51-75 | 30-50 |

See footnotes at end of table.

TABLE 13.--ESTIMATED ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

| Soil name and map symbol | Depth | USDA texture | Classification Unified | Classification AASHTO | Fragments > 3 inches | Percentage passing sieve number-- 4 | 10 | 40 | 200 | Liquid limit | Plasticity index |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | In | | | | Pct | | | | | Pct | |
| Guyton: | | | | | | | | | | | |
| Gu | 0-21 | Silt loam | ML, CL-ML | A-4 | 0 | 100 | 100 | 95-100 | 80-95 | <27 | NP-7 |
| | 21-38 | Silt loam, silty clay loam. | CL, CL-ML | A-6, A-4 | 0 | 100 | 100 | 95-100 | 75-95 | 26-40 | 6-21 |
| | 38-82 | Silt loam, silty clay loam. | CL, | A-6, A-4 | 0 | 100 | 100 | 95-100 | 75-95 | <40 | NP-21 |
| Jena: | | | | | | | | | | | |
| Je | 0-8 | Fine sandy loam | SM, ML, CL-ML, SM-SC | A-4, A-2 | 0 | 100 | 100 | 60--95 | 30-75 | <22 | NP-4 |
| | 8-40 | Very fine sandy loam, fine sandy loam, sandy loam. | SM, ML, CL-ML, SM-SC | A-4, A-2 | 0 | 100 | 100 | 55-90 | 25-70 | <22 | NP-4 |
| | 40-60 | Fine sandy loam, sandy loam, loamy fine sand. | SM | A-2 A-4 | 0 | 100 | 100 | 50-80 | 20-50 | --- | NP |
| Longview: | | | | | | | | | | | |
| LoA | 0-7 | Silt loam | CL, CL-ML | A-4, A-6 | 0 | 100 | 100 | 95-100 | 70-90 | 25-35 | 7-15 |
| | 7-31 | Silt loam, silty clay loam. | CL | A-6 | 0 | 100 | 100 | 90-100 | 80-95 | 28-37 | 11-16 |
| | 31-60 | Silty clay loam, silt loam. | CL, CH | A-7, A-6 | 0 | 100 | 100 | 95-100 | 75-90 | 38-55 | 18-30 |
| Maben: | | | | | | | | | | | |
| MaE | 0-4 | Loam | CL-ML, CL | A-4, A-6 | 0 | 95-100 | 90-100 | 80-95 | 50-70 | 15-40 | 5-20 |
| | 4-24 | Clay, clay loam, silty clay. | MH, CH | A-7 | 0 | 90-100 | 90-100 | 90-100 | 75-95 | 50-80 | 18-40 |
| | 24-40 | Silty clay loam, loam, and weathered bedrock. | CL | A-4, A-6 | 0 | 95-100 | 80-95 | 70-90 | 60-75 | 30-40 | 10-18 |
| | 40-60 | Stratified fine sandy loam to weathered bedrock. | SC, SM-SC, CL, CL-ML | A-4 | 0 | 95-100 | 80-95 | 70-85 | 40-55 | 20-30 | 5-10 |
| [1]MWE: | | | | | | | | | | | |
| Maben part | 0-4 | Loam | CL-ML, CL | A-4, A-6 | 0 | 95-100 | 90-100 | 80-95 | 50-70 | 15-40 | 5-20 |
| | 4-24 | Clay, clay loam, silty clay. | MH, CH | A-7 | 0 | 90-100 | 90-100 | 90-100 | 75-95 | 50-80 | 18-40 |
| | 24-40 | Clay loam, silty clay loam, loam, and weathered bedrock. | CL | A-4, A-6 | 0 | 95-100 | 80-95 | 70-90 | 60-75 | 30-40 | 10-18 |
| | 40-60 | Stratified fine sandy loam to weathered bedrock. | SC, SM-SC, CL, CL-ML | A-4 | 0 | 95-100 | 80-95 | 70-85 | 40-55 | 20-30 | 5-10 |
| Wilcox part | 0-4 | Silty clay loam | CL, CH | A-7 | 0 | 100 | 100 | 95-100 | 80-95 | 41-51 | 19-25 |
| | 4-44 | Clay, silty clay, silty clay loam. | CH, MH | A-7 | 0 | 100 | 100 | 95-100 | 80-95 | 50-72 | 22-40 |
| | 44-50 | Clay | CH, MH | A-7 | 0 | 100 | 100 | 90-100 | 75-95 | 60-135 | 39-80 |
| | 50-72 | Weathered bedrock. | | | | | | | | | |
| Tippah part | 0-5 | Silt loam | CL, CL-ML | A-4 | 0 | 100 | 100 | 90-100 | 70-90 | 20-30 | 4-10 |
| | 5-28 | Silty clay loam, silt loam. | CL | A-6, A-7 | 0 | 100 | 98-100 | 90-100 | 85-95 | 30-45 | 11-22 |
| | 28-66 | Silty clay loam, silty clay, clay. | CH, MH | A-7 | 0 | 100 | 99-100 | 80-100 | 60-95 | 50-65 | 25-40 |

See footnotes at end of table.

TABLE 13.--ESTIMATED ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

| Soil name and map symbol | Depth | USDA texture | Classification | | Frag-ments > 3 inches | Percentage passing sieve number-- | | | | Liquid limit | Plas-ticity index |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Unified | AASHTO | | 4 | 10 | 40 | 200 | | |
| | In | | | | Pct | | | | | Pct | |
| Oaklimeter: | | | | | | | | | | | |
| Oa---------------- | 0-7 | Silt loam------- | ML, CL, CL-ML | A-4 | 0 | 100 | 100 | 90-100 | 70-90 | <30 | NP-8 |
| | 7-27 | Very fine sandy loam, silt loam, loam. | ML, CL, CL-ML | A-4 | 0 | 100 | 100 | 85-95 | 60-85 | <30 | NP-8 |
| | 27-72 | Silt loam, silty clay loam. | ML, CL, CL-ML | A-4 | 0 | 100 | 100 | 90-100 | 90-100 | <30 | NP-10 |
| Ora: | | | | | | | | | | | |
| OrC2, OrD2, OrD3-- | 0-4 | Loam------------ | SM-SC, SM, ML, CL-ML | A-4, A-2 | 0 | 100 | 95-100 | 65-85 | 30-65 | <30 | NP-5 |
| | 4-21 | Clay loam, sandy clay loam, loam. | CL, ML | A-6, A-4, A-7 | 0 | 100 | 95-100 | 80-100 | 50-80 | 25-48 | 8-22 |
| | 21-48 | Sandy clay loam, loam, fine sandy loam. | CL, ML | A-6, A-7, A-4 | 0 | 100 | 95-100 | 80-100 | 50-75 | 25-43 | 8-25 |
| | 48-60 | Sandy clay loam, loam, fine sandy loam. | CL, ML | A-4, A-6, A-7 | 0 | 100 | 95-100 | 80-98 | 50-60 | 30-49 | 10-30 |
| Ozan: | | | | | | | | | | | |
| Oz---------------- | 0-26 | Silt loam, loam, sandy loam. | SM, ML | A-4 | 0 | 95-100 | 95-100 | 90-100 | 40-85 | <20 | NP-3 |
| | 26-60 | Loam, sandy loam | ML, SM, CL-ML, CL, SM-SC | A-4 | 0 | 95-100 | 95-100 | 90-100 | 47-80 | <30 | NP-10 |
| | 60-80 | Loam, sandy clay loam, sandy loam. | CL, CL-ML, ML | A-4, A-6 | 0 | 95-100 | 95-100 | 90-100 | 51-85 | <35 | NP-18 |
| Prentiss: | | | | | | | | | | | |
| PnB--------------- | 0-29 | Silt loam, fine sandy loam. | CL-ML, ML SM-SC, SM CL | A-4 | 0 | 100 | 100 | 65-100 | 36-85 | <30 | NP-10 |
| | 29-60 | Loam, silt loam, fine sandy loam. | CL, ML, SC, SM CL-ML, SM-SC | A-6, A-4 | 0 | 100 | 100 | 70-100 | 40-85 | 20-35 | 4-12 |
| Providence: | | | | | | | | | | | |
| PoA, PoB2, PoC2, PoD2, PoD3, PrE--- | 0-8 | Silt loam------- | ML, CL CL-ML | A-4 | 0 | 100 | 100 | 100 | 85-100 | <30 | NP-10 |
| | 8-22 | Silty clay loam, silt loam. | CL | A-7, A-6 | 0 | 100 | 100 | 95-100 | 85-100 | 30-45 | 11-20 |
| | 22-28 | Silt loam, silty clay loam. | CL | A-6 | 0 | 100 | 100 | 90-100 | 70-90 | 25-40 | 11-20 |
| | 28-60 | Loam, clay loam, sandy clay loam. | CL, SM, SC | A-6, A-4 | 0 | 100 | 95-100 | 70-95 | 40-80 | 15-35 | 8-18 |

See footnotes at end of table.

TABLE 13.--ESTIMATED ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

| Soil name and map symbol | Depth | USDA texture | Classification: Unified | Classification: AASHTO | Fragments > 3 inches | Percentage passing sieve number--: 4 | 10 | 40 | 200 | Liquid limit | Plasticity index |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | In | | | | Pct | | | | | Pct | |
| Smithdale: SmE | 0-7 | Sandy loam | SM, SM-SC | A-4 | 0 | 100 | 85-100 | 60-80 | 36-49 | <20 | NP-5 |
| | 7-30 | Clay loam, sandy clay loam. | SM-SC, SC, CL, CL-ML | A-6, A-4 | 0 | 100 | 85-100 | 80-95 | 45-75 | 23-38 | 7-15 |
| | 30-83 | Loam, sandy loam | SM, ML, CL, SC CL-ML, SM-SC | A-4 | 0 | 100 | 85-100 | 65-80 | 36-70 | <30 | NP-10 |
| [1]SOE: Smithdale part | 0-7 | Sandy loam | SM, SM-SC | A-4 | 0 | 100 | 85-100 | 60-80 | 36-49 | <20 | NP-5 |
| | 7-30 | Clay loam, sandy clay loam. | SM-SC, SC, CL, CL-ML | A-6, A-4 | 0 | 100 | 85-100 | 80-95 | 45-75 | 23-38 | 7-15 |
| | 30-83 | Loam, sandy loam | SM, ML, CL, SC CL-ML, SM-SC | A-4 | 0 | 100 | 85-100 | 65-80 | 36-70 | <30 | NP-10 |
| Ora part | 0-4 | Loam | SM-SC, SM, ML, CL-ML | A-4, A-2 | 0 | 100 | 95-100 | 65-85 | 30-65 | <30 | NP-5 |
| | 4-21 | Clay loam, sandy clay loam, loam. | CL, ML | A-6, A-4, A-7 | 0 | 100 | 95-100 | 80-100 | 50-80 | 25-48 | 8-22 |
| | 21-48 | Sandy clay loam, loam, fine sandy loam. | CL, ML | A-6, A-7, A-4 | 0 | 100 | 95-100 | 80-100 | 50-75 | 25-43 | 8-25 |
| | 48-60 | Sandy clay loam, loam, fine sandy loam. | CL, ML | A-4, A-6, A-7 | 0 | 100 | 95-100 | 80-98 | 50-60 | 30-49 | 10-30 |
| Stough: StA | 0-9 | Fine sandy loam, loam. | SM-SC, SM, ML, CL-ML | A-4 | 0 | 100 | 100 | 65-95 | 35-65 | <25 | NP-7 |
| | 9-37 | Loam, fine sandy loam. | ML, CL, CL-ML | A-4 | 0 | 100 | 100 | 75-95 | 50-75 | <25 | NP-8 |
| | 37-65 | Fine sandy loam, sandy clay loam, loam. | SM, SC, CL, ML | A-4, A-6 | 0 | 100 | 100 | 65-90 | 40-65 | 25-40 | 8-15 |
| Sweatman: SuE | 0-6 | Loam | CL-ML, CL, ML | A-4 | 0 | 100 | 100 | 90-100 | 55-90 | <35 | NP-10 |
| | 6-30 | Clay, silty clay, silty clay loam. | MH | A-7 | 0 | 95-100 | 95-100 | 95-100 | 90-95 | 42-30 | 12-42 |
| | 30-45 | Silty clay, silty clay loam, sandy clay loam. | MH | A-7 | 0 | 95-100 | 80-100 | 80-100 | 50-85 | 42-80 | 18-42 |
| | 45-60 | Stratified weathered bedrock to fine sandy loam. | ML, CL CL-ML | A-4 | 0 | 95-100 | 75-100 | 60-95 | 55-95 | <-30 | 5-10 |
| [1]SvD: Sweatman part | 0-6 | Loam | CL-ML, CL, ML | A-4 | 0 | 100 | 100 | 90-100 | 55-90 | <35 | NP-10 |
| | 6-30 | Clay, silty clay, silty clay loam. | MH | A-7 | 0 | 95-100 | 95-100 | 95-100 | 90-95 | 42-80 | 18-42 |
| | 30-45 | Silty clay, silty clay loam sandy clay loam | MH | A-7 | 0 | 95-100 | 80-100 | 80-100 | 70-85 | 42-80 | 18-42 |
| | 45-60 | Stratified weathered bedrock to fine sandy loam. | ML, CL CL-ML | A-4 | 0 | 95-100 | 75-100 | 60-95 | 55-95 | <-30 | 5-10 |

See footnotes at end of table.

TABLE 13.--ESTIMATED ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

| Soil name and map symbol | Depth | USDA texture | Classification Unified | Classification AASHTO | Fragments > 3 inches | Percentage passing sieve number-- 4 | 10 | 40 | 200 | Liquid limit | Plasticity index |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | In | | | | Pct | | | | | Pct | |
| Sweatman: | | | | | | | | | | | |
| Providence part-- | 0-8 | Silt loam------- | ML, CL | A-4 | 0 | 100 | 100 | 100 | 85-100 | <30 | NP-10 |
| | 8-22 | Silty clay loam, silt loam. | CL | A-7, A-6 | 0 | 100 | 100 | 95-100 | 85-100 | 30-45 | 11-20 |
| | 22-28 | Silt loam, silty clay loam. | CL | A-6 | 0 | 100 | 100 | 90-100 | 70-90 | 25-40 | 11-20 |
| | 28-60 | Loam, clay loam, sandy clay loam. | CL, SM, SC | A-6, A-4 | 0 | 100 | 95-100 | 70-95 | 40-80 | 15-35 | 8-18 |
| [1]SWE: | | | | | | | | | | | |
| Sweatman part---- | 0-6 | Loam------------ | CL-ML, CL, ML | A-4 | 0 | 100 | 100 | 90-100 | 55-90 | <35 | NP-10 |
| | 6-30 | Clay, silty clay, silty clay loam. | MH | A-7 | 0 | 95-100 | 95-100 | 95-100 | 90-95 | 42-80 | 18-42 |
| | 30-45 | Silty clay, silty clay loam, sandy clay loam. | MH | A-7 | 0 | 95-100 | 75-100 | 75-100 | 70-85 | 42-80 | 18-42 |
| | 45-60 | Stratified weathered bedrock to fine sandy loam. | ML, CL CL-ML | A-4 | 0 | 95-100 | 75-100 | 60-95 | 55-95 | <-30 | 5-10 |
| Providence part-- | 0-8 | Silt loam------- | ML, CL, CL-ML | A-4 | 0 | 100 | 100 | 100 | 85-100 | <30 | NP-10 |
| | 8-22 | Silty clay loam, silt loam. | CL | A-7, A-6 | 0 | 100 | 100 | 95-100 | 85-100 | 30-45 | 11-20 |
| | 22-28 | Silt loam, silty clay loam. | CL | A-6 | 0 | 100 | 100 | 90-100 | 70-90 | 25-40 | 11-20 |
| | 28-60 | Loam, clay loam, sandy clay loam. | CL, SM, SC | A-6, A-4 | 0 | 100 | 95-100 | 70-95 | 40-80 | 15-35 | 8-18 |
| Tippah: | | | | | | | | | | | |
| TaB2, TaC2, TaC3, TaD2-------------- | 0-5 | Silt loam------- | CL, CL-ML | A-4 | 0 | 100 | 100 | 90-100 | 70-90 | 20-30 | 4-10 |
| | 5-28 | Silty clay loam, silt loam. | CL | A-6, A-7 | 0 | 100 | 98-100 | 90-100 | 85-95 | 30-45 | 11-22 |
| | 28-66 | Silty clay loam, silty clay, clay. | CH, MH | A-7 | 0 | 100 | 99-100 | 80-100 | 60-95 | 50-65 | 25-40 |
| Urbo: | | | | | | | | | | | |
| Ur---------------- | 0-13 | Silty clay loam | CL | A-6 | 0 | 100 | 100 | 95-100 | 95-100 | 30-40 | 15-25 |
| | 13-72 | Silty clay, silty clay loam, clay. | CL, CH | A-7 | 0 | 100 | 100 | 95-100 | 90-100 | 44-63 | 20-36 |
| Verdun Variant: | | | | | | | | | | | |
| Ve---------------- | 0-7 | Silt loam------- | ML, CL-ML | A-4 | 0 | 100 | 100 | 100 | 95-100 | <27 | NP-7 |
| | 7-42 | Silty clay loam, silt loam. | CL | A-6, A-7 | 0 | 95-100 | 90-100 | 90-100 | 80-100 | 32-45 | 11-21 |
| | 42-75 | Silt loam, silty clay loam. | CL | A-6, A-4 | 0 | 95-100 | 90-100 | 90-100 | 80-100 | 33-40 | 8-17 |
| Wilcox: | | | | | | | | | | | |
| W1B2-------------- | 0-4 | Silty clay loam | CL, CH | A-7 | 0 | 100 | 100 | 95-100 | 80-95 | 41-51 | 19-25 |
| | 4-44 | Clay, silty clay, silty clay loam. | CH, MH | A-7 | 0 | 100 | 100 | 95-100 | 80-95 | 50-72 | 22-40 |
| | 44-50 | Clay------------ | CH, MH | A-7 | 0 | 100 | 100 | 90-100 | 75-95 | 60-135 | 39-80 |
| | 50-72 | Weathered bedrock. | | | | | | | | | |

See footnotes at end of table.

TABLE 13.--ESTIMATED ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

| Soil name and map symbol | Depth | USDA texture | Classification | | Frag- ments > 3 inches | Percentage passing sieve number-- | | | | Liquid limit | Plas- ticity index |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Unified | AASHTO | | 4 | 10 | 40 | 200 | | |
| | In | | | | Pct | | | | | Pct | |
| Wilcox: | | | | | | | | | | | |
| W1C2--------------- | 0-4 | Silt loam-------- | CL, CH | A-7 | 0 | 100 | 100 | 95-100 | 80-95 | 41-51 | 19-25 |
| | 4-44 | Clay, silty clay, silty clay loam. | CH, MH | A-7 | 0 | 100 | 100 | 95-100 | 80-95 | 50-72 | 22-40 |
| | 44-50 | Clay------------- | CH, MH | A-7 | 0 | 100 | 100 | 90-100 | 75-95 | 60-135 | 39-80 |
| | 50-72 | Weathered bedrock. | | | | | | | | | |

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 14.--ESTIMATED PHYSICAL AND CHEMICAL PROPERTIES

[Dashes indicate data were not available. The symbol < means less than; > means greater than. The erosion tolerance factor (T) is for the entire profile. Absence of an entry means data were not estimated]

| Soil name and map symbol | Depth | Permea-bility | Available water capacity | Soil reaction | Salinity | Shrink-swell potential | Risk of corrosion: Uncoated steel | Risk of corrosion: Concrete | Erosion factors: K | Erosion factors: T |
|---|---|---|---|---|---|---|---|---|---|---|
| | In | In/hr | In/in | pH | Mmhos/cm | | | | | |
| Ariel: | | | | | | | | | | |
| Ae | 0-30 | 0.6-2.0 | 0.20-0.22 | 4.5-6.0 | <2 | Low | Low | Moderate | --- | --- |
| | 30-65 | 0.2-0.6 | 0.16-0.20 | 4.5-5.5 | <2 | Low | Low | Moderate | --- | |
| Arkabutla: | | | | | | | | | | |
| Ak | 0-6 | 0.6-2.0 | 0.20-0.22 | 4.5-5.5 | <2 | Low | High | High | --- | --- |
| | 6-60 | 0.6-2.0 | 0.18-0.21 | 4.5-5.5 | <2 | Low | High | High | --- | |
| Bonn: | | | | | | | | | | |
| Bo | 0-5 | 0.2-0.6 | 0.15-0.23 | 5.6-7.3 | <2 | Low | High | Low | 0.49 | 3 |
| | 5-20 | <0.06 | 0.08-0.14 | 5.6-9.0 | <2 | Low | High | Low | 0.49 | |
| | 20-70 | <0.2 | 0.08-0.14 | 6.6-9.0 | <2 | Low | High | Low | 0.49 | |
| Bruno: | | | | | | | | | | |
| Br | 0-7 | 6.0-20 | 0.10-0.15 | 5.1-7.3 | <2 | Low | Low | Low | --- | --- |
| | 7-31 | 6.0-20 | 0.05-0.10 | 5.1-7.3 | <2 | Low | Low | Low | --- | |
| | 31-62 | 6.0-20 | 0.02-0.05 | 5.1-7.3 | <2 | Very low | Low | Low | --- | |
| Bude: | | | | | | | | | | |
| BuA | 0-16 | 0.6-2.0 | 0.18-0.23 | 5.1-6.0 | <2 | Low | High | High | 0.49 | 3 |
| | 16-32 | 0.06-0.2 | 0.10-0.12 | 4.5-6.0 | <2 | Low | High | High | 0.43 | |
| | 32-72 | 0.06-0.2 | 0.10-0.12 | 4.5-6.0 | <2 | Moderate | High | High | 0.37 | |
| Cascilla: | | | | | | | | | | |
| Ca | 0-60 | 0.6-2.0 | 0.18-0.22 | 4.5-6.5 | <2 | Low | Low | Moderate | --- | --- |
| Chenneby: | | | | | | | | | | |
| Ce | 0-7 | 0.6-2.0 | 0.15-0.20 | 4.5-7.3 | <2 | Low | High | Moderate | --- | --- |
| | 7-60 | 0.6-2.0 | 0.15-0.20 | 4.5-5.5 | <2 | Low | High | Moderate | --- | |
| [1]CH: | | | | | | | | | | |
| Chenneby part | 0-7 | 0.6-2.0 | 0.15-0.20 | 6.6-7.3 | <2 | Low | High | Moderate | --- | --- |
| | 7-60 | 0.6-2.0 | 0.15-0.20 | 4.5-5.5 | <2 | Low | High | Moderate | --- | |
| Arkabutla part | 0-6 | 0.6-2.0 | 0.20-0.22 | 4.5-6.0 | <2 | Low | High | High | --- | --- |
| | 6-50 | 0.6-2.0 | 0.18-0.21 | 4.5-5.5 | <2 | Low | High | High | --- | |
| Falkner: | | | | | | | | | | |
| FaA, FaB | 0-6 | 0.2-0.6 | 0.20-0.22 | 4.5-6.0 | <2 | Low | High | Moderate | 0.43 | 4 |
| | 6-33 | 0.2-0.6 | 0.19-0.22 | 4.5-6.0 | <2 | Moderate | High | Moderate | 0.43 | |
| | 33-75 | 0.06-0.2 | 0.16-0.18 | 4.0-6.5 | <2 | High | High | Moderate | 0.24 | |
| Guyton: | | | | | | | | | | |
| Gu | 0-21 | 0.6-2.0 | 0.20-0.23 | 4.5-6.0 | <2 | Low | High | Moderate | 0.49 | 3 |
| | 21-38 | 0.06-0.2 | 0.15-0.22 | 4.5-5.5 | <2 | Low | High | Moderate | 0.37 | |
| | 38-82 | 0.06-2.0 | 0.15-0.22 | 4.5-5.5 | <2 | Low | High | Low | 0.37 | |
| Jena: | | | | | | | | | | |
| Je | 0-8 | 0.6-2.0 | 0.12-0.20 | 4.5-6.0 | <2 | Low | Low | High | --- | --- |
| | 8-40 | 0.6-2.0 | 0.10-0.20 | 4.5-5.5 | <2 | Low | Low | High | | |
| | 40-60 | 2.0-6.0 | 0.08-0.14 | 4.5-5.5 | <2 | Low | Low | High | | |
| Longview: | | | | | | | | | | |
| LoA | 0-7 | 0.6-2.0 | 0.20-0.22 | 4.0-5.5 | <2 | Low | High | High | 0.43 | 3 |
| | 7-31 | 0.2-0.6 | 0.18-0.20 | 4.0-5.5 | <2 | Low | High | High | 0.43 | |
| | 31-60 | 0.2-0.6 | 0.15-0.20 | 4.0-5.5 | <2 | Moderate | High | High | 0.43 | |
| Maben: | | | | | | | | | | |
| MaE | 0-4 | 0.6-2.0 | 0.15-0.20 | 5.6-6.0 | <2 | Low | High | Moderate | 0.37 | 3 |
| | 4-24 | 0.2-0.6 | 0.14-0.18 | 4.5-6.0 | <2 | High | High | Moderate | 0.28 | |
| | 24-40 | 0.2-0.6 | 0.14-0.18 | 4.5-6.0 | <2 | Moderate | High | Moderate | 0.28 | |
| | 40-60 | 0.2-0.6 | 0.10-0.15 | 4.5-6.0 | <2 | Low | High | Moderate | --- | |

See footnotes at end of table.

TABLE 14.--ESTIMATED PHYSICAL AND CHEMICAL PROPERTIES--Continued

| Soil name and map symbol | Depth | Permeability | Available water capacity | Soil reaction | Salinity | Shrink-swell potential | Risk of corrosion: Uncoated steel | Risk of corrosion: Concrete | Erosion factors: K | Erosion factors: T |
|---|---|---|---|---|---|---|---|---|---|---|
| | In | In/hr | In/in | pH | Mmhos/cm | | | | | |
| Maben: | | | | | | | | | | |
| [1]MWE: | | | | | | | | | | |
| Maben part-------- | 0-4 | 0.6-2.0 | 0.15-0.20 | 5.6-6.0 | <2 | Low-------- | High----- | Moderate | 0.37 | 3 |
| | 4-24 | 0.2-0.6 | 0.14-0.18 | 4.5-6.0 | <2 | High------- | High----- | Moderate | 0.28 | |
| | 24-40 | 0.2-0.6 | 0.14-0.18 | 4.5-6.0 | <2 | Moderate | High----- | Moderate | 0.28 | |
| | 40-60 | 0.2-0.6 | 0.10-0.15 | 4.5-6.0 | <2 | Low-------- | High----- | Moderate | --- | |
| Wilcox part------- | 0-4 | 0.06-0.2 | 0.19-0.21 | 4.0-5.5 | <2 | High------- | High----- | High----- | 0.37 | 4 |
| | 4-44 | <0.06 | 0.18-0.20 | 4.0-5.5 | <2 | High------- | High----- | High----- | 0.32 | |
| | 44-50 | <0.06 | 0.15-0.18 | 4.0-5.5 | <2 | High------- | High----- | High----- | 0.32 | |
| | 50-72 | - | - | - | <2 | | | | | |
| Tippah part------- | 0-5 | 0.6-2.0 | 0.20-0.22 | 4.5-6.0 | <2 | Low-------- | High----- | High----- | 0.43 | 4 |
| | 5-28 | 0.06-0.2 | 0.19-0.21 | 4.5-6.0 | <2 | Moderate | High----- | High----- | 0.43 | |
| | 28-66 | 0.06-0.2 | 0.16-0.18 | 4.5-6.0 | <2 | High------- | High----- | High----- | 0.24 | |
| Oaklimeter: | | | | | | | | | | |
| Oa----------------- | 0-7 | 0.6-2.0 | 0.20-0.22 | 4.5-5.5 | <2 | Low-------- | Moderate | High----- | --- | --- |
| | 7-27 | 0.6-2.0 | 0.15-0.20 | 4.5-5.5 | <2 | Low-------- | Moderate | High----- | --- | |
| | 27-72 | 0.6-2.0 | 0.20-0.22 | 4.5-5.5 | <2 | Low-------- | Moderate | High----- | --- | |
| Ora: | | | | | | | | | | |
| OrC2, OrD2, OrD3-- | 0-4 | 2.0-6.0 | 0.10-0.13 | 4.5-5.5 | <2 | Low-------- | Moderate | High----- | 0.32 | 3 |
| | 4-21 | 0.6-2.0 | 0.12-0.18 | 4.5-5.5 | <2 | Low-------- | Moderate | High----- | 0.37 | |
| | 21-48 | 0.2-0.6 | 0.05-0.10 | 4.5-5.5 | <2 | Low-------- | Moderate | High----- | 0.37 | |
| | 48-60 | 0.6-2.0 | 0.10-0.15 | 4.5-5.5 | <2 | Low-------- | Moderate | High----- | 0.32 | |
| Ozan: | | | | | | | | | | |
| Oz----------------- | 0-26 | 0.6-2.0 | 0.14-0.17 | 4.5-6.0 | <2 | Low-------- | High----- | Moderate | --- | --- |
| | 26-67 | 0.06-0.2 | 0.15-0.18 | 4.5-6.0 | <2 | Low-------- | High----- | Moderate | --- | |
| | 60-80 | 0.06-0.2 | 0.15-0.18 | 4.5-6.0 | <2 | Low-------- | High----- | Moderate | --- | |
| Prentiss: | | | | | | | | | | |
| PnB---------------- | 0-29 | 0.6-2.0 | 0.12-0.16 | 4.5-5.5 | <2 | Low-------- | Moderate | High----- | 0.24 | 3 |
| | 29-60 | 0.2-0.6 | 0.06-0.09 | 4.5-5.5 | <2 | Low-------- | Moderate | High----- | 0.24 | |
| Providence: | | | | | | | | | | |
| PoA, PoB2, PoC2, PoD3, PoD2, PrE--- | 0-8 | 0.6-2.0 | 0.20-0.22 | 4.5-6.0 | <2 | Low-------- | Moderate | Moderate | 0.43 | 3 |
| | 8-22 | 0.6-2.0 | 0.20-0.22 | 4.5-6.0 | <2 | Low-------- | Moderate | Moderate | 0.43 | |
| | 22-28 | 0.2-0.6 | 0.08-0.10 | 4.5-6.0 | <2 | Moderate | Moderate | Moderate | 0.43 | |
| | 28-60 | 0.2-0.6 | 0.08-0.10 | 4.5-6.0 | <2 | Low-------- | Moderate | Moderate | 0.32 | |
| Smithdale: | | | | | | | | | | |
| SmE---------------- | 0-7 | 2.0-6.0 | 0.14-0.16 | 4.5-5.5 | <2 | Low-------- | Low------ | Moderate | 0.28 | 5 |
| | 7-30 | 0.6-2.0 | 0.15-0.17 | 4.5-5.5 | <2 | Low-------- | Low------ | Moderate | 0.28 | |
| | 30-83 | 2.0-6.0 | 0.14-0.16 | 4.5-5.5 | <2 | Low-------- | Low------ | Moderate | 0.24 | |
| [1]SOE: | | | | | | | | | | |
| Smithdale part--- | 0-7 | 2.0-6.0 | 0.14-0.16 | 4.5-5.5 | <2 | Low-------- | Low------ | Moderate | 0.28 | 5 |
| | 7-30 | 0.6-2.0 | 0.15-0.17 | 4.5-5.5 | <2 | Low-------- | Low------ | Moderate | 0.28 | |
| | 30-83 | 2.0-6.0 | 0.14-0.16 | 4.5-5.5 | <2 | Low-------- | Low------ | Moderate | 0.24 | |
| Ora part---------- | 0-4 | 2.0-6.0 | 0.10-0.13 | 4.0-5.5 | <2 | Low-------- | Moderate | High----- | 0.32 | 3 |
| | 4-21 | 0.6-2.0 | 0.12-0.18 | 4.0-5.5 | <2 | Low-------- | Moderate | High----- | 0.37 | |
| | 21-48 | 0.2-0.6 | 0.05-0.10 | 4.0-5.5 | <2 | Low-------- | Moderate | High----- | 0.37 | |
| | 48-60 | 0.6-2.0 | 0.10-0.15 | 4.0-5.5 | <2 | Low-------- | Moderate | High----- | 0.32 | |
| Stough: | | | | | | | | | | |
| StA---------------- | 0-9 | 0.6-2.0 | 0.12-0.18 | 4.5-5.5 | <2 | Low-------- | Moderate | High----- | 0.28 | 3 |
| | 9-37 | 0.2-0.6 | 0.07-0.11 | 4.5-5.5 | <2 | Low-------- | Moderate | High----- | 0.37 | |
| | 37-65 | 0.2-0.6 | 0.07-0.11 | 4.5-5.5 | <2 | Low-------- | Moderate | High----- | 0.37 | |
| Sweatman: | | | | | | | | | | |
| SuE---------------- | 0-6 | 0.6-2.0 | 0.20-0.22 | 4.5-5.5 | <2 | Low-------- | High----- | High----- | 0.37 | 3 |
| | 6-30 | 0.2-0.6 | 0.16-0.20 | 4.5-5.5 | <2 | Moderate | High----- | High----- | 0.28 | |
| | 30-45 | 0.2-0.6 | 0.16-0.20 | 4.5-5.5 | <2 | Moderate | High----- | High----- | 0.28 | |
| | 45-60 | 0.2-0.6 | 0.10-0.18 | 4.5-5.5 | <2 | Moderate | High----- | High----- | --- | |

See footnotes at end of table.

TABLE 14.--ESTIMATED PHYSICAL AND CHEMICAL PROPERTIES--Continued

| Soil name and map symbol | Depth | Permeability | Available water capacity | Soil reaction | Salinity | Shrink-swell potential | Risk of corrosion: Uncoated steel | Risk of corrosion: Concrete | Erosion factors: K | Erosion factors: T |
|---|---|---|---|---|---|---|---|---|---|---|
| | In | In/hr | In/in | pH | Mmhos/cm | | | | | |
| Sweatman: | | | | | | | | | | |
| [1]SvD: | | | | | | | | | | |
| Sweatman part---- | 0-6 | 0.6-2.0 | 0.20-0.22 | 4.5-5.5 | <2 | Low------- | High----- | High----- | 0.37 | 3 |
| | 6-30 | 0.2-0.6 | 0.16-0.20 | 4.5-5.5 | <2 | Moderate | High----- | High----- | 0.28 | |
| | 30-45 | 0.2-0.6 | 0.16-0.20 | 4.5-5.5 | <2 | Moderate | High----- | High----- | 0.28 | |
| | 45-60 | 0.2-0.6 | 0.10-0.18 | 4.5-5.5 | <2 | Moderate | High----- | High----- | --- | |
| Providence part-- | 0-8 | 0.6-2.0 | 0.20-0.22 | 4.5-6.0 | <2 | Low------- | Moderate | Moderate | 0.43 | 3 |
| | 8-22 | 0.6-2.0 | 0.20-0.22 | 4.5-6.0 | <2 | Low------- | Moderate | Moderate | 0.43 | |
| | 22-28 | 0.2-0.6 | 0.08-0.10 | 4.5-6.0 | <2 | Moderate | Moderate | Moderate | 0.32 | |
| | 28-60 | 0.2-0.6 | 0.08-0.10 | 4.5-6.0 | <2 | Low------- | Moderate | Moderate | 0.32 | |
| [1]SWE: | | | | | | | | | | |
| Sweatman part---- | 0-6 | 0.6-2.0 | 0.20-0.22 | 4.5-5.5 | <2 | Low------- | High----- | High----- | 0.37 | 3 |
| | 6-30 | 0.2-0.6 | 0.16-0.20 | 4.5-5.5 | <2 | Moderate | High----- | High----- | 0.28 | |
| | 30-45 | 0.2-0.6 | 0.16-0.20 | 4.5-5.5 | <2 | Moderate | High----- | High----- | 0.28 | |
| | 45-60 | 0.2-0.6 | 0.10-0.18 | 4.5-5.5 | <2 | Moderate | High----- | High----- | --- | |
| Providence part-- | 0-8 | 0.6-2.0 | 0.20-0.22 | 4.5-6.0 | <2 | Low------- | Moderate | Moderate | 0.43 | 3 |
| | 8-22 | 0.6-2.0 | 0.20-0.22 | 4.5-6.0 | <2 | Low------- | Moderate | Moderate | 0.43 | |
| | 22-28 | 0.2-0.6 | 0.08-0.10 | 4.5-6.0 | <2 | Moderate | Moderate | Moderate | 0.32 | |
| | 28-60 | 0.2-0.6 | 0.08-0.10 | 4.5-6.0 | <2 | Low------- | Moderate | Moderate | 0.32 | |
| Tippah: | | | | | | | | | | |
| TaB2, TaC2, TaC3, TaD2-------------- | 0-5 | 0.6-2.0 | 0.20-0.22 | 4.5-6.0 | <2 | Low------- | High----- | High----- | 0.43 | 4 |
| | 5-28 | 0.06-0.2 | 0.19-0.21 | 4.5-6.0 | <2 | Moderate | High----- | High----- | 0.43 | |
| | 28-66 | 0.06-0.2 | 0.16-0.18 | 4.5-6.0 | <2 | High------ | High----- | High----- | 0.24 | |
| Urbo: | | | | | | | | | | |
| Ur--------------- | 0-13 | 0.06-0.2 | 0.19-0.21 | 4.5-5.5 | <2 | Low------- | High----- | High----- | --- | --- |
| | 13-72 | <0.06 | 0.18-0.20 | 4.5-5.5 | <2 | Moderate-- | High----- | High----- | --- | --- |
| Verdun Variant: | | | | | | | | | | |
| Ve---------------- | 0-7 | 0.2-0.6 | 0.16-0.23 | 5.6-7.8 | <2 | Low------- | High----- | Low------ | 0.55 | 2 |
| | 7-42 | <0.06 | 0.14-0.18 | 6.6-8.4 | <2 | Moderate | High----- | Low------ | 0.55 | |
| | 42-75 | 0.06-0.2 | 0.14-0.18 | 7.9-9.0 | <2 | Low------- | High----- | Low------ | 0.55 | |
| Wilcox: | | | | | | | | | | |
| W1B2, W1C2-------- | 0-4 | 0.06-0.2 | 0.19-0.21 | 4.0-5.5 | <2 | High------ | High----- | High----- | 0.37 | 4 |
| | 4-44 | <0.06 | 0.18-0.20 | 4.0-5.5 | <2 | High------ | High----- | High----- | 0.32 | |
| | 44-50 | <0.06 | 0.15-0.18 | 4.0-5.5 | <2 | High------ | High----- | High----- | 0.32 | |
| | 50-72 | - | - | - | <2 | | | | | |

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 15.--SOIL AND WATER FEATURES

[Absence of an entry indicates the feature is not a concern. See text for descriptions of symbols and such terms as "rare," "brief," and "perched." The symbol < means less than; > means greater than]

| Soil name and map symbol | Hydrologic group | Flooding | | | High water table | | | Bedrock | |
|---|---|---|---|---|---|---|---|---|---|
| | | Frequency | Duration | Months | Depth | Kind | Months | Depth | Hardness |
| Ariel: | | | | | | | | | |
| Ae | C | Common | Brief | Jan-Apr | 2.0-3.0 | Apparent | Jan-Apr | >60 | --- |
| Arkabutla: | | | | | | | | | |
| Ak | C | Common | Very brief to brief. | Jan-Apr | 1.5-2.5 | Apparent | Jan-Apr | >60 | --- |
| Bonn: | | | | | | | | | |
| Bo | D | None | --- | --- | 0-2.0 | Perched | Dec-Apr | >60 | --- |
| Bruno: | | | | | | | | | |
| Br | A | None to common. | Brief | Dec-Jun | 4.0-6.0 | Apparent | Dec-Apr | >60 | --- |
| Bude: | | | | | | | | | |
| BuA | C | None | --- | --- | 0.5-1.5 | Perched | Jan-Apr | >60 | --- |
| Cascilla: | | | | | | | | | |
| Ca | B | Rare to common. | Brief | Jan-Mar | >6.0 | --- | --- | >60 | --- |
| Chenneby: | | | | | | | | | |
| Ce | C | Common | Very brief | Dec-Apr | 1.0-2.5 | Apparent | Jan-Mar | >60 | --- |
| [1]CH: | | | | | | | | | |
| Chenneby part | C | Common | Very brief | Dec-Apr | 1.0-2.5 | Apparent | Jan-Mar | >60 | --- |
| Arkabutla part | C | Common | Very brief to brief. | Jan-Apr | 1.5-2.5 | Apparent | Jan-Apr | >60 | --- |
| Falkner: | | | | | | | | | |
| FaA, FaB | C | None | --- | --- | 1.5-2.5 | Perched | Jan-Mar | >60 | --- |
| Guyton: | | | | | | | | | |
| Gu | D | None to common. | Very brief to long. | Jan-Dec | 0-1.5 | Apparent | Dec-May | >60 | --- |
| Jena: | | | | | | | | | |
| Je | B | Rare to common. | Very brief to long. | Dec-Apr | >6.0 | --- | --- | >60 | --- |
| Longview: | | | | | | | | | |
| LoA | C | None | --- | --- | 1.0-3.0 | Perched | Dec-Apr | >60 | --- |
| Maben: | | | | | | | | | |
| MaE | C | None | --- | --- | >6.0 | --- | --- | >60 | --- |
| [1]MWE: | | | | | | | | | |
| Maben part | C | None | --- | --- | >6.0 | --- | --- | >60 | --- |
| Wilcox part | D | None | --- | --- | 1.5-3.0 | Perched | Jan-Apr | 40-80 | Rip-pable |
| Tippah part | C | None | --- | --- | 1.5-2.5 | Perched | Dec-Apr | >60 | --- |
| Oaklimeter: | | | | | | | | | |
| Oa | C | Common | Brief | Nov-Mar | 1.5-2.5 | Apparent | Nov-Mar | >60 | --- |
| Ora: | | | | | | | | | |
| OrC2, OrD2, OrD3 | C | None | --- | --- | 2.0-3.5 | Perched | Feb-Apr | >60 | --- |
| Ozan: | | | | | | | | | |
| Oz | D | None | --- | --- | 1.0-2.5 | Perched | Dec-May | >60 | --- |

See footnotes at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

| Soil name and map symbol | Hydrologic group | Flooding | | | High water table | | | Bedrock | |
|---|---|---|---|---|---|---|---|---|---|
| | | Frequency | Duration | Months | Depth | Kind | Months | Depth | Hardness |
| | | | | | Ft | | | In | |
| Prentiss: PnB | C | None | --- | --- | 2.0-2.5 | Perched | Jan-Mar | >60 | --- |
| Providence: PoA, PoB2, PoC2, PoD2, PoD3, PrE | C | None | --- | --- | 1.5-3.0 | Perched | Jan-Mar | >60 | --- |
| Smithdale: SmE | B | None | --- | --- | >6.0 | --- | --- | >60 | --- |
| [1]SOE: Smithdale part | B | None | --- | --- | >6.0 | --- | --- | >60 | --- |
| Ora part | C | None | --- | --- | 2.0-3.5 | Perched | Feb-Apr | >60 | --- |
| Stough: StA | C | None | --- | --- | 1.0-1.5 | Perched | Jan-Apr | >60 | --- |
| Sweatman: SuE | C | None | --- | --- | >6.0 | --- | --- | >60 | --- |
| [1]SvD: Sweatman part | C | None | --- | --- | >6.0 | --- | --- | >60 | --- |
| Providence part | C | None | --- | --- | 1.5-3.0 | Perched | Jan-Mar | >60 | --- |
| [1]SWE: Sweatman part | C | None | --- | --- | >6.0 | --- | --- | >60 | --- |
| Providence part | C | None | --- | --- | 1.5-3.0 | Perched | Jan-Mar | >60 | --- |
| Tippah: TaB2, TaC2, TaC3, TaD2 | C | None | --- | --- | 1.5-2.5 | Perched | Dec-Apr | >60 | --- |
| Urbo: Ur | D | Common | Brief to long. | Jan-Mar | 1.0-2.0 | Apparent | Jan-Mar | >60 | --- |
| Verdun Variant: Ve | D | None | --- | --- | 0.5-1.0 | Perched | Dec-Apr | >60 | --- |
| Wilcox: WlB2, WlC2 | D | None | --- | --- | 1.5-3.0 | Perched | Jan-Apr | 40-80 | Rip-pable |

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 16--CHEMICAL ANALYSIS

[Selected Soils Analyzed by the Soil Genesis and Morphology Laboratory of the Mississippi Agricultural and Forestry Experiment Station]

| Soil series | Lab. No. | Horizon | Depth from surface (inches) | Reaction 1:1 ($H_2O$) | Exch. cations (meg/100g.) | | | | | | Base saturation by sum of cations (percent) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Ca++ | Mg++ | H+ | K+ | Na+ | Sum cations (meg/100g.) | |
| Ariel------ | 1298 | Ap | 0-6 | 5.7 | 4.9 | 0.6 | 3.2 | 0.1 | 0.1 | 8.9 | 64 |
| | 1299 | B21 | 6-16 | 5.8 | 4.8 | 0.5 | 3.7 | 0.0 | 0.1 | 9.1 | 59 |
| | 1300 | B22 | 16-30 | 5.0 | 1.7 | 0.7 | 5.3 | 0.0 | 0.1 | 7.8 | 32 |
| | 1301 | A2b | 30-37 | 4.9 | 1.1 | 0.6 | 3.3 | 0.1 | 0.1 | 5.2 | 36 |
| | 1302 | B21b | 37-45 | 4.9 | 0.8 | 0.5 | 5.5 | 0.1 | 0.1 | 7.0 | 21 |
| | 1303 | B22b | 45-58 | 4.9 | 0.4 | 0.5 | 4.7 | 0.1 | 0.1 | 5.8 | 17 |
| | 1304 | B23b | 58-65 | 5.0 | 0.1 | 1.3 | 5.7 | 0.1 | 0.1 | 7.3 | 22 |
| Falkner---- | 1305 | Ap | 0-6 | 6.1 | 17.0 | 7.0 | 5.4 | 0.1 | 0.1 | 24.6 | 78 |
| | 1306 | B21t | 6-11 | 5.0 | 4.5 | 2.2 | 10.7 | 0.1 | 0.2 | 17.7 | 39 |
| | 1307 | B22t | 11-21 | 4.7 | 2.3 | 2.4 | 13.6 | 0.1 | 0.2 | 18.6 | 27 |
| | 1308 | B23t | 21-33 | 4.8 | 1.9 | 4.3 | 14.6 | 0.2 | 0.3 | 21.3 | 33 |
| | 1309 | IIB24t | 33-63 | 4.8 | 4.7 | 13.7 | 13.8 | 0.3 | 0.6 | 33.1 | 58 |
| | 1310 | IIB25t | 63-75 | 4.8 | 6.6 | 11.3 | 10.4 | 0.1 | 0.8 | 29.2 | 64 |
| Oaklimeter- | 32 | Ap | 0-7 | 5.5 | 2.9 | 0.6 | 5.2 | 0.2 | 0.1 | 9.1 | 42 |
| | 33 | B21 | 7-16 | 5.4 | 1.9 | 0.6 | 6.3 | 0.2 | 0.1 | 9.1 | 31 |
| | 34 | B22 | 16-27 | 5.1 | 1.6 | 0.7 | 6.8 | 0.2 | 0.1 | 9.4 | 28 |
| | 35 | A2b & B21tb | 27-35 | 5.3 | 1.3 | 0.7 | 6.8 | 0.2 | 0.1 | 9.1 | 25 |
| | 36 | B22tb | 35-46 | 5.2 | 0.6 | 1.1 | 7.6 | 0.2 | 0.2 | 9.7 | 22 |
| | 37 | B23tb | 46-72 | 5.4 | 1.1 | 2.3 | 7.8 | 0.1 | 0.5 | 11.8 | 34 |
| Prentiss--- | none | A1 | 0-1 | 4.5 | 0.6 | 0.4 | 13.4 | 0.4 | 0.1 | 14.9 | 10 |
| | | A12 | 1-6 | 4.7 | 0.1 | 0.2 | 5.6 | 0.6 | 0.3 | 6.8 | 18 |
| | | B1 | 6-11 | 5.0 | 0.6 | 0.5 | 3.9 | 0.1 | 0.1 | 5.2 | 26 |
| | | B21 | 11-22 | 5.1 | 1.8 | 0.6 | 5.5 | 0.1 | 0.0 | 8.0 | 31 |
| | | B22 | 22-29 | 5.1 | 0.7 | 0.7 | 8.5 | 0.1 | 0.1 | 10.1 | 16 |
| | | Bx1 | 29-40 | 5.1 | 0.4 | 0.8 | 8.3 | 0.1 | 0.1 | 9.7 | 14 |
| | | Bx2 | 40-50 | 5.2 | 0.2 | 0.6 | 7.0 | 0.1 | 0.1 | 8.0 | 12 |
| | | Bx3 | 50-60 | - | - | - | - | - | - | - | - |
| Tippah----- | 1316 | Ap | 0-5 | 5.4 | 2.7 | 1.0 | 4.7 | 0.2 | 0.0 | 8.6 | 45 |
| | 1317 | B21t | 5-16 | 4.9 | 2.0 | 2.9 | 10.1 | 0.1 | 0.0 | 15.1 | 32 |
| | 1318 | B22t | 16-22 | 5.0 | 1.2 | 2.2 | 8.9 | 0.1 | 0.1 | 12.5 | 29 |
| | 1319 | B23t | 22-28 | 5.2 | 1.7 | 4.1 | 7.2 | 0.1 | 0.3 | 13.4 | 46 |
| | 1320 | IIB24t | 28-46 | 4.7 | 4.1 | 8.5 | 9.6 | 0.2 | 0.7 | 23.1 | 58 |
| | 1321 | IIB25t | 46-66 | 4.6 | 5.6 | 12.4 | 6.1 | 0.1 | 1.0 | 25.2 | 76 |
| Urbo------- | 1311 | Ap | 0-6 | 5.9 | 20.0 | 2.6 | 4.9 | 0.2 | 0.2 | 27.9 | 82 |
| | 1312 | B21g | 6-13 | 4.9 | 4.8 | 3.3 | 15.3 | 0.2 | 0.3 | 23.9 | 36 |
| | 1313 | B22g | 13-25 | 4.9 | 2.7 | 2.5 | 18.1 | 0.2 | 0.4 | 23.9 | 24 |
| | 1314 | B23g | 24-43 | 4.9 | 2.5 | 3.6 | 20.9 | 0.2 | 0.5 | 27.7 | 25 |
| | 1315 | B24g | 43-72 | 4.9 | 4.4 | 5.9 | 17.8 | 0.3 | 0.7 | 29.1 | 39 |
| Wilcox----- | 1323 | Ap | 0-4 | 6.0 | 12.8 | 3.1 | 5.1 | .3 | .1 | 21.4 | 76 |
| | 1324 | B21t | 4-8 | 4.8 | 2.7 | 4.2 | 12.6 | .1 | .1 | 19.7 | 36 |
| | 1325 | B22t | 8-21 | 4.7 | 3.8 | 7.8 | 18.8 | .2 | .3 | 30.9 | 39 |
| | 1326 | B23t | 21-44 | 4.3 | 2.5 | 9.7 | 15.8 | .2 | .5 | 28.7 | 45 |
| | 1327 | B24t | 44-50 | 4.1 | 3.5 | 4.3 | 13.5 | .3 | .8 | 22.4 | 40 |

TABLE 17.--PARTICLE SIZE DISTRIBUTION

[Selected soils analyzed by Soil and Morphology Laboratory of the Mississippi Agricultural and Forestry Experiment Station. Dashes indicate data not determined]

| Soil series | Lab. No. | Horizon | Depth from surface (inches) | Particle size distribution: Total clay (0.002 mm) | Total silt (0.05 to 0.002 mm) | Total sand (2.0 to 0.05 mm) |
|---|---|---|---|---|---|---|
| | | | | Pct | Pct | Pct |
| Ariel---------- | 1298 | Ap | 0-6 | 12.6 | 75.8 | 11.6 |
| | 1299 | B21 | 6-16 | 11.4 | 77.2 | 11.4 |
| | 1300 | B22 | 16-30 | 12.6 | 78.4 | 9.0 |
| | 1301 | A2b | 30-37 | 11.4 | 79.5 | 9.1 |
| | 1302 | B21b | 37-45 | 12.7 | 79.3 | 8.0 |
| | 1303 | B22b | 45-58 | 11.4 | 82.7 | 5.9 |
| | 1304 | B23b | 58-65 | 12.6 | 73.8 | 13.6 |
| Falkner-------- | 1305 | Ap | 0-6 | 10.0 | 72.4 | 8.6 |
| | 1306 | B21t | 6-11 | 24.8 | 69.5 | 5.7 |
| | 1307 | B22t | 11-21 | 28.3 | 66.3 | 5.4 |
| | 1308 | B23t | 21-33 | 32.7 | 61.9 | 5.4 |
| | 1309 | IIB24t | 33-63 | 39.4 | 55.9 | 4.7 |
| | 1310 | IIB25t | 63-75 | 41.4 | 52.0 | 6.6 |
| Oaklimeter----- | 32 | Ap | 0-7 | 10.0 | 80.8 | 9.1 |
| | 33 | B21 | 7-16 | 13.1 | 70.6 | 16.3 |
| | 34 | B22 | 16-27 | 15.2 | 60.8 | 24.0 |
| | 35 | A2b & B21tb | 27-35 | 15.2 | 74.0 | 10.8 |
| | 36 | B22tb | 35-46 | 17.7 | 69.5 | 12.8 |
| | 37 | B23tb | 46-72 | 24.1 | 52.4 | 23.5 |
| Prentiss------- | none | A1 | 0-1 | --- | --- | --- |
| | | A12 | 1-6 | --- | --- | --- |
| | | B1 | 6-11 | 5.6 | 61.0 | 33.4 |
| | | B21 | 11-22 | 11.0 | 59.8 | 29.2 |
| | | B22 | 22-29 | 14.5 | 59.9 | 25.6 |
| | | Bx1 | 29-40 | 13.7 | 62.6 | 23.7 |
| | | Bx2 | 40-50 | 9.9 | 63.5 | 26.6 |
| | | Bx3 | 50-60 | --- | --- | --- |
| Tippah--------- | 1316 | Ap | 0-5 | 10.1 | 77.5 | 12.4 |
| | 1317 | B21t | 5-16 | 37.6 | 58.6 | 3.8 |
| | 1318 | B22t | 16-22 | 27.6 | 63.6 | 8.8 |
| | 1319 | B23t | 22-28 | 29.2 | 53.6 | 17.2 |
| | 1320 | IIB24t | 28-46 | 44.7 | 39.9 | 15.4 |
| | 1321 | IIB25t | 46-66 | 41.0 | 46.9 | 12.1 |
| Urbo----------- | 1311 | Ap | 0-6 | 31.5 | 58.9 | 9.6 |
| | 1312 | B21g | 6-13 | 35.3 | 57.1 | 7.6 |
| | 1313 | B22g | 13-25 | 40.8 | 52.9 | 6.3 |
| | 1314 | B23g | 25-43 | 41.6 | 51.4 | 7.0 |
| | 1315 | B24g | 43-72 | 44.4 | 49.4 | 6.2 |
| Wilcox--------- | 1323 | Ap | 0-4 | 26.1 | 60.7 | 13.2 |
| | 1324 | B21t | 4-8 | 39.9 | 55.8 | 4.3 |
| | 1325 | B22t | 8-21 | 49.5 | 46.9 | 3.6 |
| | 1326 | B23t | 21-44 | 47.7 | 48.9 | 3.4 |
| | 1327 | B24t | 44-50 | 56.8 | 39.2 | 4.0 |

TABLE 18.--ENGINEERING TEST DATA

[Tests performed by Mississippi State Highway Department in accordance with standard procedures of the American Association
Transportation Officials (AASHTO)]

| Soil name and location | Report No. | Depth from surface (inches) | Moisture density[1] | | Mechnical analysis[2] | | | | | | | | Liqu limi |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Percentage passing sieve-- | | | | Percentage smaller than-- | | | | |
| | | | Maximum dry density (lb. per cu. ft.) | Optimum moisture (percent) | No. 4 4.7 mm | No. 10 2.0 mm | No. 40 0.42 mm | No. 200 0.074 mm | 0.05 mm | 0.02 mm | 0.005 mm | 0.002 mm | |
| Falkner silt loam 4 miles SW Mantee, of the SW1/4SE1/4 Sec. 15, T16S, R2E. | S-1 S71Miss-78-2-3 | 11-21 | 104.6 | 19.2 | 100 | 100 | 97 | 95 | 91 | 72 | 38 | 29 | 45 |
| | S-2 S71Miss-78-2-4 | 21-33 | 104.4 | 19.0 | 100 | 100 | 98 | 96 | 90 | 73 | 42 | 32 | 45 |
| | S-3 S71Miss-78-2-5 | 33-63 | 102.8 | 20.0 | 100 | 100 | 98 | 96 | 90 | 77 | 48 | 37 | 52 |
| Ozan silt loam 8.5 miles NW Tomnolen, Miss. 56 yds. E. Montgomery Co. line, SW1/4 SW1/4 SW1/4 Sec. 18, T19N, R8E. | S-1 S72Miss-78-7-2 | 6-14 | 115.3 | 11.2 | 100 | 100 | 97 | 56 | 53 | 32 | 8 | 4 | - |
| | S-2 S72Miss-78-7-4 | 26-40 | 121.8 | 10.7 | 100 | 100 | 96 | 47 | 43 | 26 | 12 | 9 | - |
| Urbo silty clay loam 130 yds. E of Miss. Hwy. #15, Barton farm, NE1/4NE1/4 Sec. 14, T16S, R2E. | S-4 S71Miss-78-1-3 | 13-25 | 96.2 | 22.9 | 100 | 100 | 99 | 95 | 90 | 81 | 50 | 36 | 47 |
| | S-5 S71Miss-78-1-4 | 25-43 | 94.5 | 24.6 | 100 | 100 | 98 | 95 | 90 | 83 | 53 | 40 | 58 |
| | S-6 S71Miss-78-1-5 | 43-72 | 94.8 | 24.8 | 100 | 100 | 99 | 95 | 92 | 83 | 59 | 44 | 63 |

[1]Based on AASHTO Designation: T 99-57, Method A(1).

[2]Mechanical analysis according to AASHTO Designation: T 88-57 (1). Results by this procedure may differ somewhat from survey procedure of the Soil Conservation Service (SCS). In the AASHTO procedure, the fine material is analyzed by the hydro grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is exc grain-size fractions. The mechanical analysis data used in this table are not suitable for naming textural classes for soils

TABLE 19.--CLASSIFICATION OF THE SOILS

[An asterisk in the first column indicates a taxadjunct to the series. See text for a description of those characteristics of this taxadjunct that are outside the range of the series]

| Soil name | Family or higher taxonomic class |
|---|---|
| Ariel | Coarse-silty, mixed, thermic Fluventic Dystrochrepts |
| Arkabutla | Fine-silty, mixed, acid, thermic Aeric Fluvaquents |
| Bonn | Fine-silty, mixed, thermic Glossic Natraqualfs |
| *Bruno | Sandy, mixed, thermic Typic Udifluvents |
| Bude | Fine-silty, mixed, thermic Glossaquic Fragiudalfs |
| Cascilla | Fine-silty, mixed, thermic Fluventic Dystrochrepts |
| Chenneby | Fine-silty, mixed, thermic Fluvaquentic Dystrochrepts |
| Falkner | Fine-silty, siliceous, thermic Aquic Paleudalfs |
| *Guyton | Fine-silty, siliceous, thermic Typic Glossaqualfs |
| Jena | Coarse-loamy, siliceous, thermic Fluventic Dystrochrepts |
| Longview | Fine-silty, siliceous, thermic Glossaquic Hapludalfs |
| Maben | Fine, mixed, thermic Ultic Hapludalfs |
| Oaklimeter | Coarse-silty, mixed, thermic Fluvaquentic Dystrochrepts |
| Ora | Fine-loamy, siliceous, thermic Typic Fragiudults |
| *Ozan | Coarse-loamy, siliceous, thermic Typic Glossaqualfs |
| Prentiss | Coarse-loamy, siliceous, thermic Glossic Fragiudults |
| Providence | Fine-silty, mixed, thermic Typic Fragiudalfs |
| Smithdale | Fine-loamy, siliceous, thermic Typic Paleudults |
| Stough | Coarse-loamy, siliceous, thermic Fragiaquic Paleudults |
| Sweatman | Clayey, mixed, thermic Typic Hapludults |
| Tippah | Fine-silty, mixed, thermic Aquic Paleudalfs |
| Urbo | Fine, mixed, acid, thermic Aeric Haplaquepts |
| Verdun Variant | Fine-silty, mixed, thermic Glossic Natraqualfs |
| Wilcox | Fine, montmorillonitic, thermic Vertic Hapludalfs |

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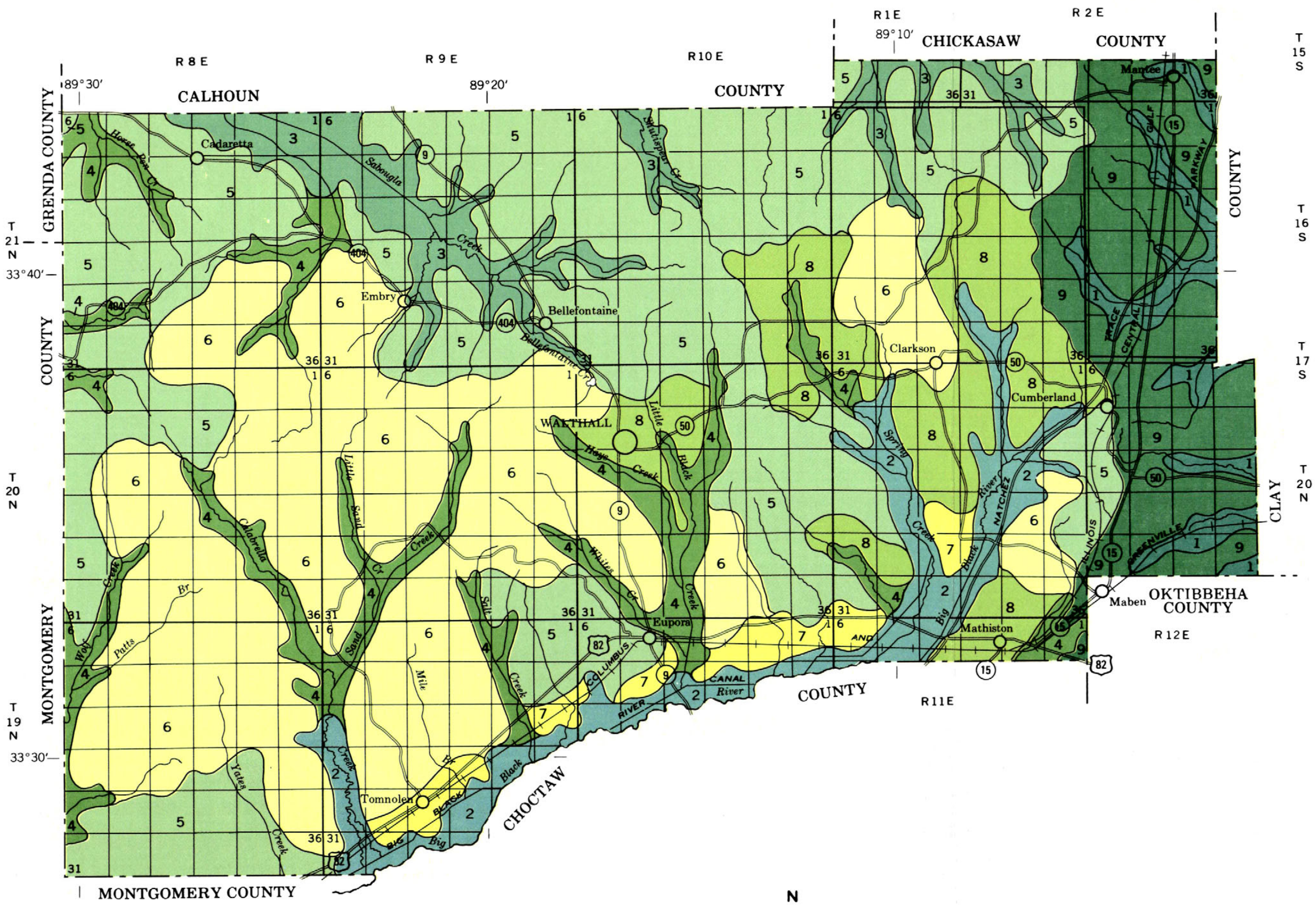
# NRCS Accessibility Statement




## SOIL ASSOCIATIONS

1 — CHENNEBY-URBO association: Deep, nearly level, somewhat poorly drained soils that have a silty and clayey subsoil.

2 — CHENNEBY-ARKABUTLA association: Deep, nearly level, somewhat poorly drained silty soils formed in silty alluvium.

3 — CHENNEBY-OAKLIMETER-CASCILLA association: Deep, nearly level, somewhat poorly drained, moderately well drained, and well drained silty soils formed in silty alluvium.

4 — OAKLIMETER-ARIEL association: Deep, nearly level, moderately well drained and well drained silty soils.

5 — SWEATMAN-PROVIDENCE association: Deep, hilly, well drained and moderately well drained soils that have a clayey and silty subsoil.

6 — SMITHDALE-ORA association: Deep, hilly, well drained and moderately well drained soils that have a loamy subsoil.

7 — BUDE-GUYTON-PROVIDENCE association: Deep, nearly level and gently sloping, somewhat poorly drained, poorly drained, and moderately well drained soils that have a silty subsoil.

8 — PROVIDENCE-TIPPAH association: Deep, gently sloping to strongly sloping, moderately well drained soils that have a silty upper subsoil.

9 — WILCOX-MABEN-TIPPAH association: Deep, gently sloping to steep, somewhat poorly drained, well drained, and moderately well drained soils that have a clayey and silty subsoil.

Compiled 1977

SECTIONALIZED TOWNSHIP

| | | | | | |
|---|---|---|---|---|---|
| 6 | 5 | 4 | 3 | 2 | 1 |
| 7 | 8 | 9 | 10 | 11 | 12 |
| 18 | 17 | 16 | 15 | 14 | 13 |
| 19 | 20 | 21 | 22 | 23 | 24 |
| 30 | 29 | 28 | 27 | 26 | 25 |
| 31 | 32 | 33 | 34 | 35 | 36 |

*Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.*

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
FOREST SERVICE

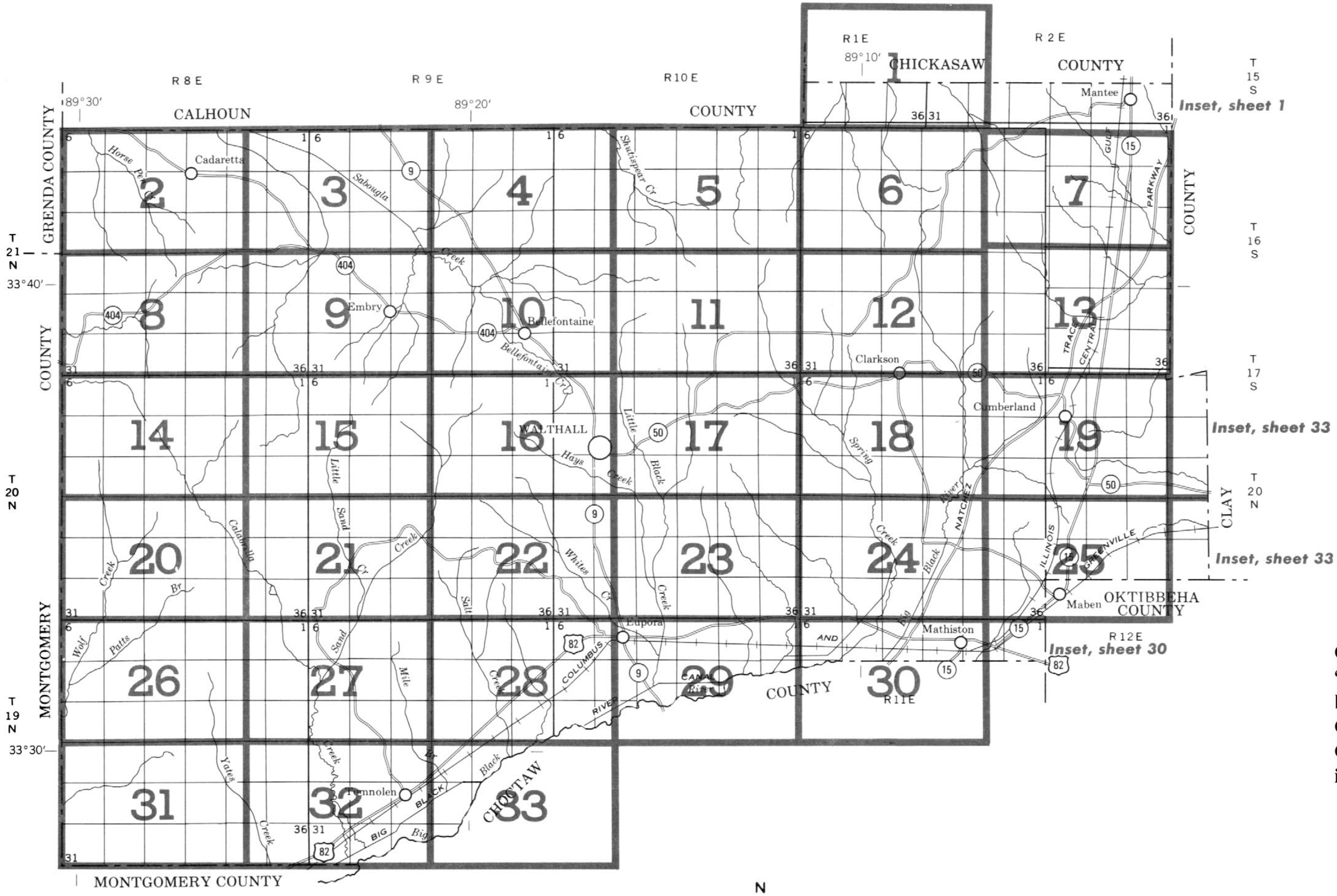
MISSISSIPPI AGRICULTURAL AND
FORESTRY EXPERIMENT STATION

# GENERAL SOIL MAP

## WEBSTER COUNTY, MISSISSIPPI

Scale 1:190,080

1 0 1 2 3 4 Miles




SECTIONALIZED TOWNSHIP

| | | | | | |
|---|---|---|---|---|---|
| 6 | 5 | 4 | 3 | 2 | 1 |
| 7 | 8 | 9 | 10 | 11 | 12 |
| 18 | 17 | 16 | 15 | 14 | 13 |
| 19 | 20 | 21 | 22 | 23 | 24 |
| 30 | 29 | 28 | 27 | 26 | 25 |
| 31 | 32 | 33 | 34 | 35 | 36 |

N

**Original text from each map sheet:**
**"This map is compiled on 1976 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned."**

# INDEX TO MAP SHEETS
## WEBSTER COUNTY, MISSISSIPPI

Scale 1:190,080

1 0 1 2 3 4 Miles

## SOIL LEGEND

The first letter, always a capital, is the initial letter of the soil name. The second letter is a capital if the mapping unit is broadly defined1/; otherwise, it is a small letter. The third letter, always a capital, shows the slope. Symbols without slope letters are those of nearly level soils. A final number, 2 in the symbol, shows the soil is eroded.

| SYMBOL | NAME |
|---|---|
| Ae | Ariel silt loam |
| Ak | Arkabutla silt loam |
| Bo | Bonn silt loam |
| Br | Bruno sandy loam |
| BuA | Bude silt loam, 0 to 2 percent slopes |
| Ca | Cascilla silt loam |
| Ce | Chenneby silt loam |
| CH | Chenneby-Arkabutla association, frequently flooded |
| FaA | Falkner silt loam, 0 to 2 percent slopes |
| FaB | Falkner silt loam, 2 to 5 percent slopes |
| Gu | Guyton silt loam |
| Je | Jena fine sandy loam |
| LoA | Longview silt loam, 0 to 2 percent slopes |
| MaE | Maben loam, 8 to 15 percent slopes |
| MWE | Maben-Wilcox-Tippah association, hilly |
| Oa | Oaklimeter silt loam |
| OrC2 | Ora loam, 5 to 8 percent slopes, eroded |
| OrD2 | Ora loam, 8 to 12 percent slopes, eroded |
| OrD3 | Ora loam, 8 to 12 percent slopes, severely eroded |
| Oz | Ozan silt loam |
| PnB | Prentiss silt loam, 2 to 5 percent slopes |
| PoA | Providence silt loam, 0 to 2 percent slopes |
| PoB2 | Providence silt loam, 2 to 5 percent slopes, eroded |
| PoC2 | Providence silt loam, 5 to 8 percent slopes, eroded |
| PoD3 | Providence silt loam, 5 to 12 percent slopes, severely eroded |
| PoD2 | Providence silt loam, 8 to 12 percent slopes, eroded |
| PrE | Providence complex, gullied |
| SmE | Smithdale sandy loam, 15 to 25 percent slopes |
| SOE | Smithdale-Ora association, hilly |
| StA | Stough fine sandy loam, 0 to 2 percent slopes |
| SuE | Sweatman loam, 15 to 25 percent slopes |
| SvD | Sweatman-Providence complex, 8 to 12 percent slopes |
| SWE | Sweatman-Providence association, hilly |
| TaB2 | Tippah silt loam, 2 to 5 percent slopes, eroded |
| TaC2 | Tippah silt loam, 5 to 8 percent slopes, eroded |
| TaC3 | Tippah silt loam, 5 to 8 percent slopes, severely eroded |
| TaD2 | Tippah silt loam, 8 to 12 percent slopes, eroded |
| Ur | Urbo silty clay loam |
| Ve | Verdun variant silt loam |
| W1B2 | Wilcox silty clay loam, 2 to 5 percent slopes, eroded |
| W1C2 | Wilcox silty clay loam, 5 to 12 percent slopes, eroded |

1/ The composition of these units is more variable than that of others in the survey area, but has been controlled well enough to be interpreted for the expected use of the soils.

# CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

## CULTURAL FEATURES

### BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Previously published

### AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery, or flood pool — Davis Airstrip; FLOOD POOL LINE

### STATE COORDINATE TICK

### LAND DIVISION CORNERS (sections and land grants)

### ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

### ROAD EMBLEMS & DESIGNATIONS

- Interstate — 79
- Federal — 410
- State — 52
- County, farm or ranch — 378

### RAILROAD

### POWER TRANSMISSION LINE (normally not shown)

### PIPE LINE (normally not shown)

### FENCE (normally not shown)

### LEVEES

- Without road
- With road
- With railroad

### DAMS

- Large (to scale)
- Medium or small — water; w

### PITS

- Gravel pit
- Mine or quarry

### MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) — Indian Mound
- Located object (label) — Tower
- Tank (label) — GAS
- Wells, oil or gas
- Windmill
- Kitchen midden

## WATER FEATURES

### DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) — CANAL
  - Drainage and/or irrigation

### LAKES, PONDS AND RESERVOIRS

- Perennial — water; w
- Intermittent — int; i

### MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

## SPECIAL SYMBOLS FOR SOIL SURVEY

### SOIL DELINEATIONS AND SYMBOLS — CeA; FoB2

### ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

### SHORT STEEP SLOPE

### GULLY

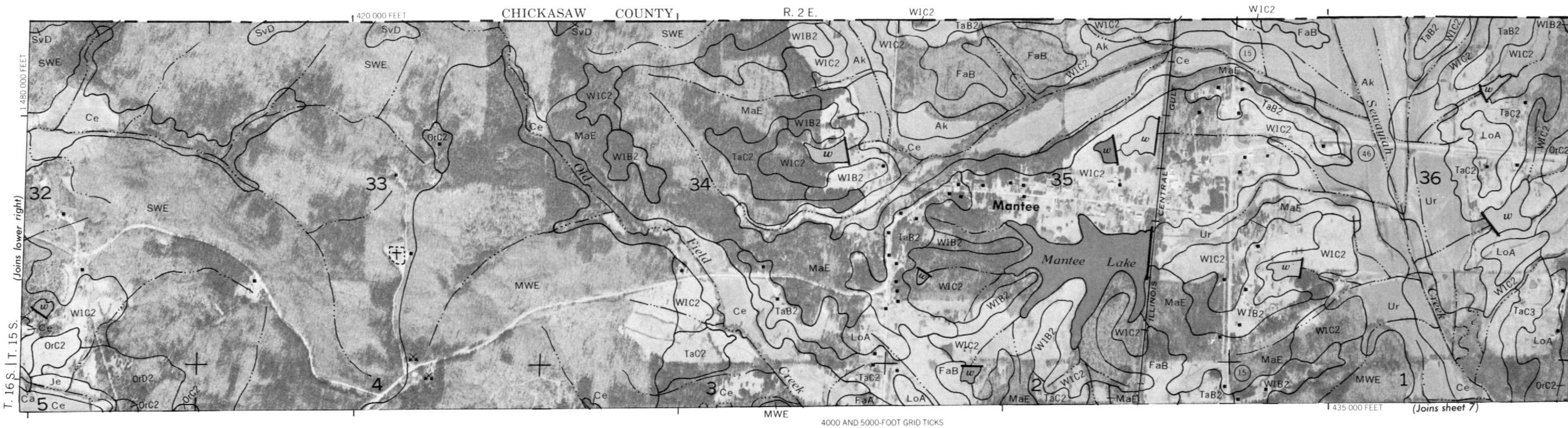
### DEPRESSION OR SINK

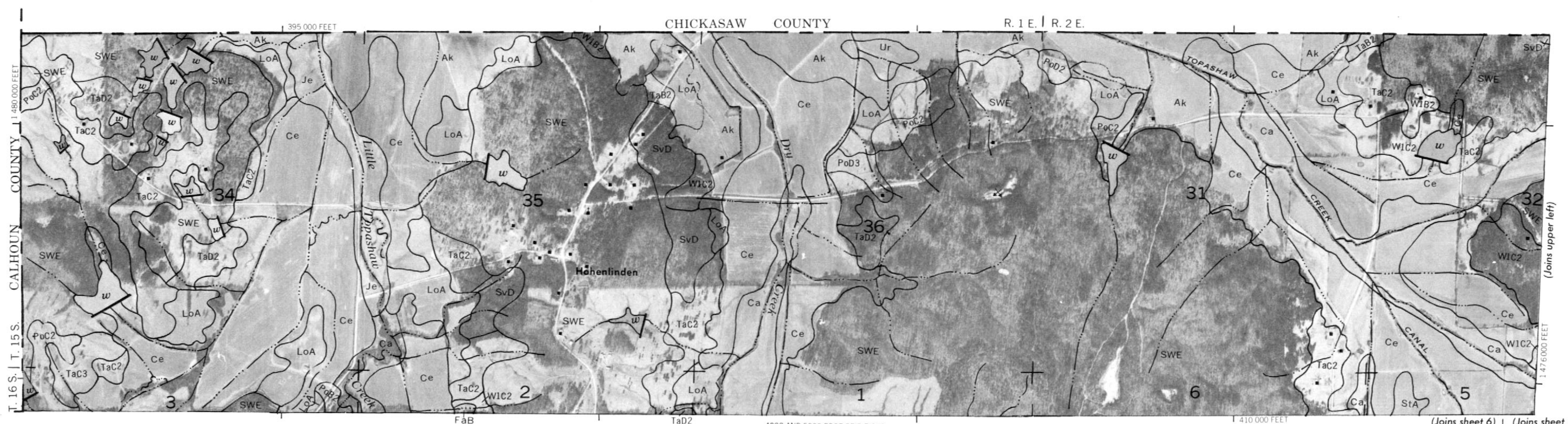
### SOIL SAMPLE SITE (normally not shown) — S

### MISCELLANEOUS

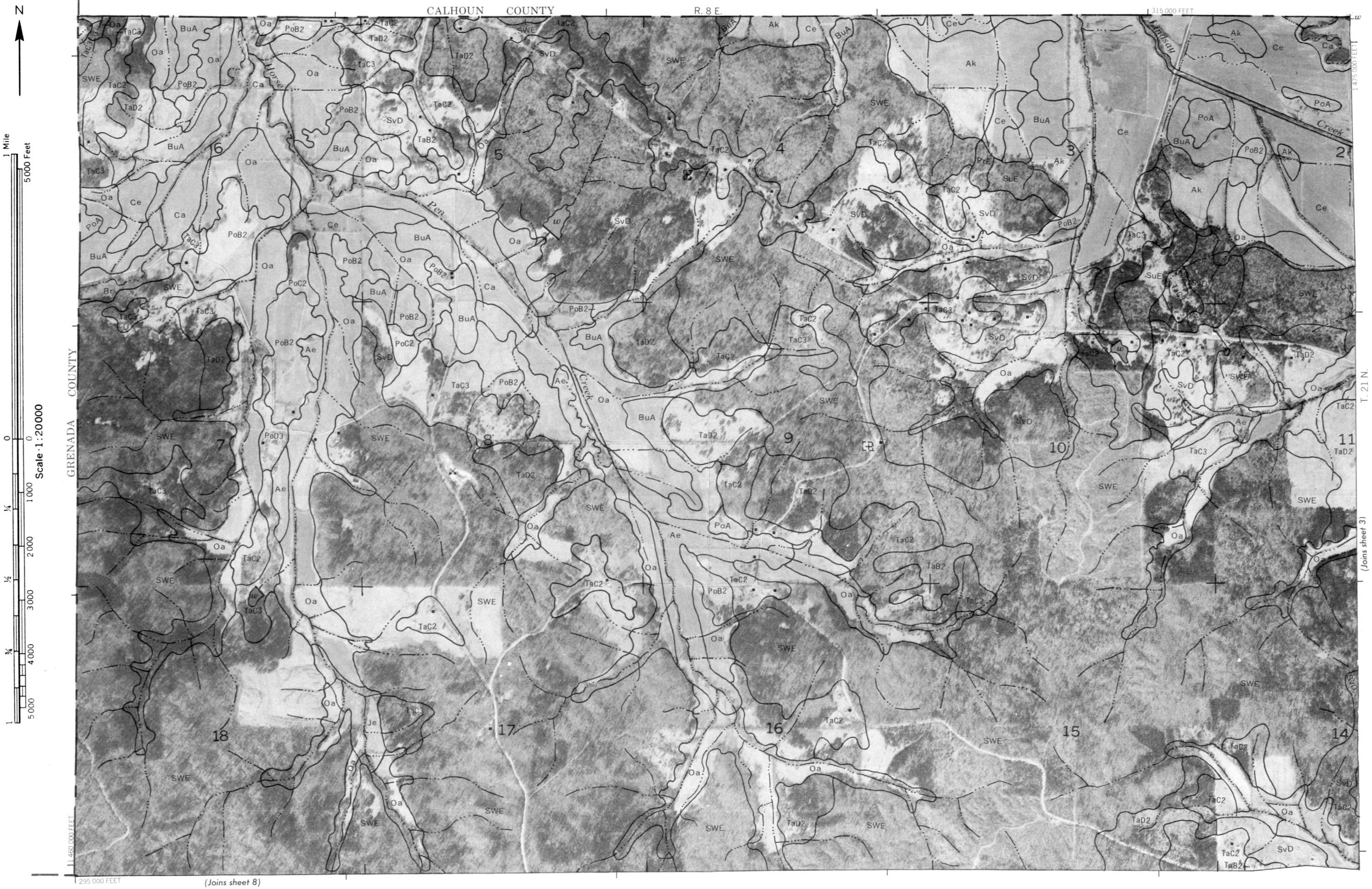
- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot

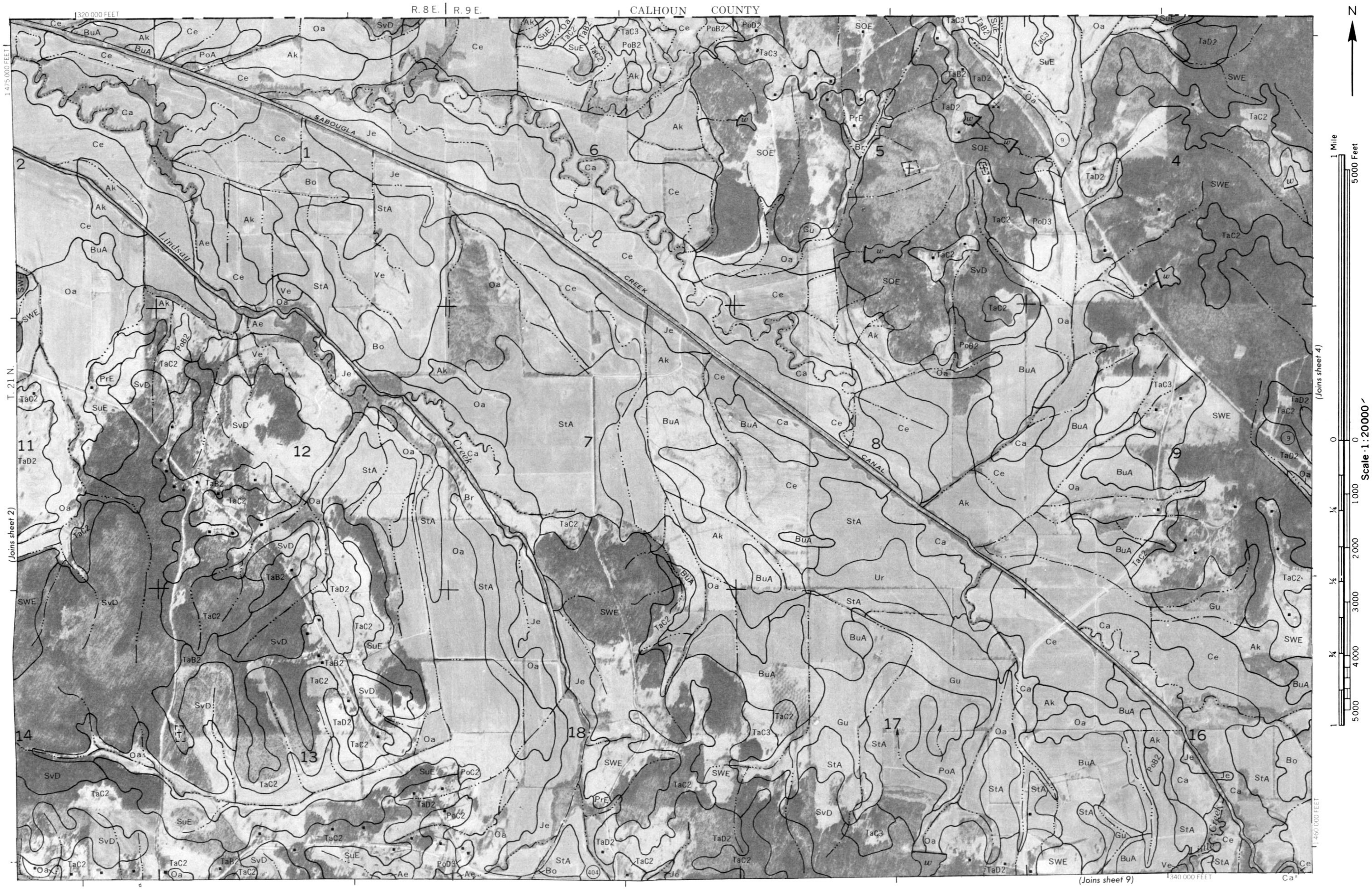
WEBSTER COUNTY, MISSISSIPPI — SHEET NUMBER 1

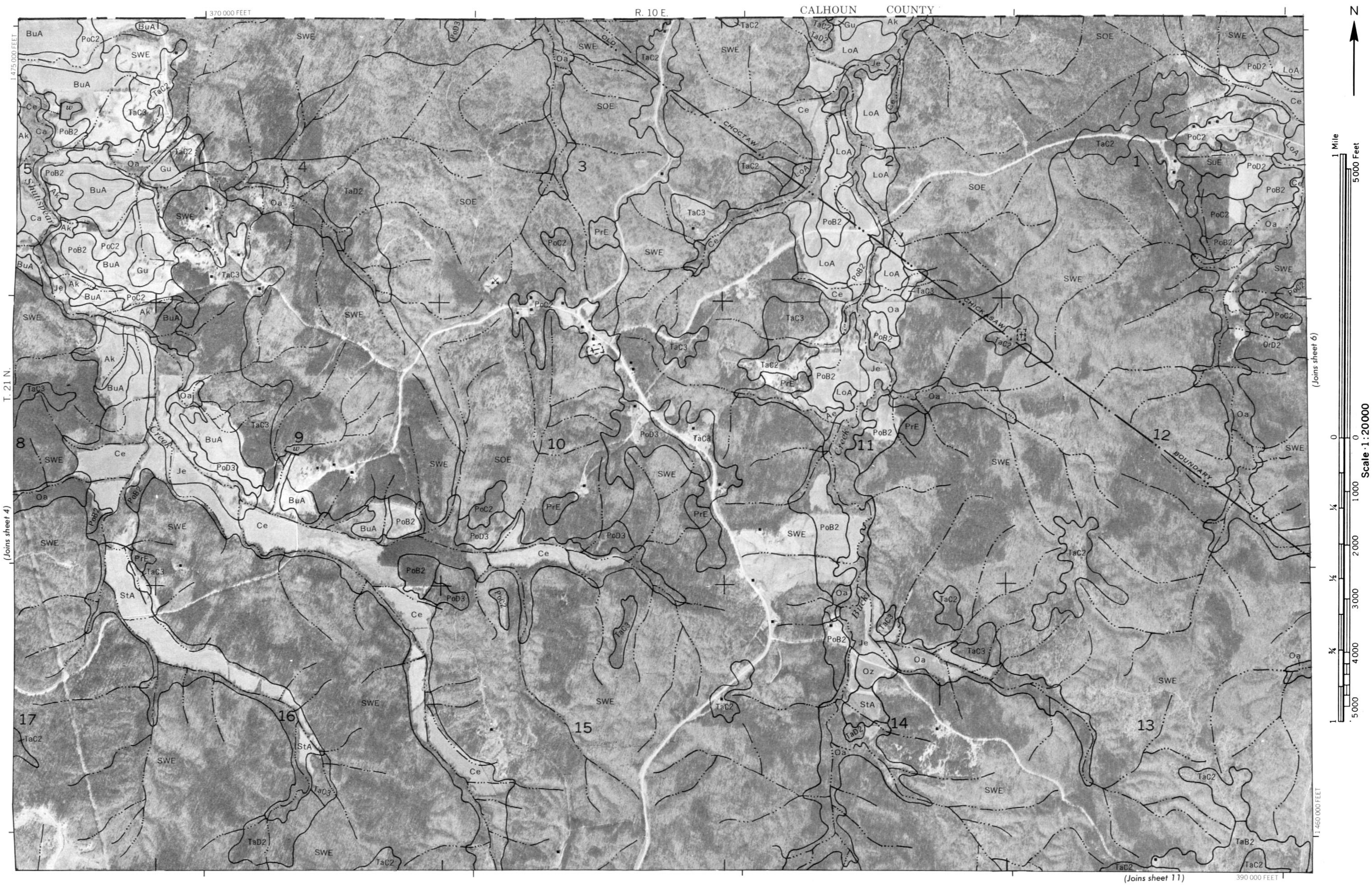



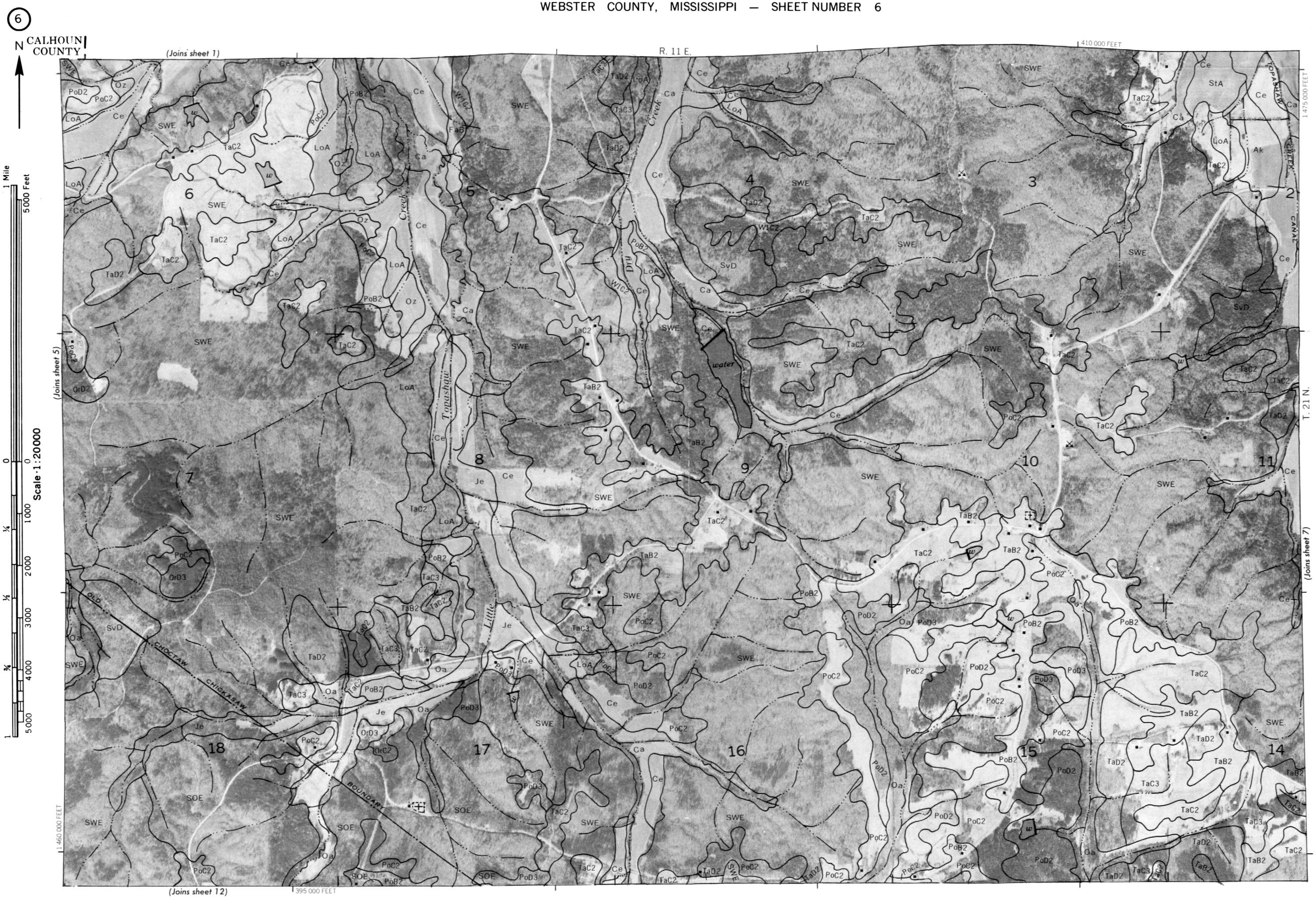
WEBSTER COUNTY, MISSISSIPPI — SHEET NUMBER 2




R. 8 E. | R. 9 E.
CALHOUN COUNTY
320 000 FEET
1 475 000 FEET
1 460 000 FEET
340 000 FEET
T. 21 N.
SABOUGLA CREEK CANAL
Lindsey Creek
(Joins sheet 2)
(Joins sheet 4)
(Joins sheet 9)
N
1 Mile
5000 Feet
Scale 1:20000
0
1/4
1/2
3/4
1
1000
2000
3000
4000
5000


N
1 Mile
5000 Feet
Scale 1:20000
CALHOUN COUNTY
R. 9 E.
R. 10 E.
365 000 FEET
1 475 000 FEET
(Joins sheet 3)
(Joins sheet 5)
T. 21 N.
1 460 000 FEET
345 000 FEET
(Joins sheet 10)
water


5
N
370 000 FEET
R. 10 E.
CALHOUN COUNTY
1 475 000 FEET
T. 21 N.
(Joins sheet 4)
(Joins sheet 6)
(Joins sheet 11)
390 000 FEET
1 460 000 FEET
CHOCTAW
CHICKASAW
BOUNDARY
OLD
Shutispear
Creek
Buck
1 Mile
5000 Feet
Scale 1:20000
1
2
3
4
5
8
9
10
11
12
13
14
15
16
17


6
N
CALHOUN COUNTY
(Joins sheet 1)
R. 11 E.
410 000 FEET
1 475 000 FEET
(Joins sheet 5)
(Joins sheet 7)
T. 21 N.
(Joins sheet 12)
395 000 FEET
1 460 000 FEET
1 Mile
5 000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
¼
½
¾
1
water
Dry Creek
Topashaw Creek
Little Topashaw
TOPASHAW CREEK CANAL
OLD CHOCTAW CHICKASAW BOUNDARY

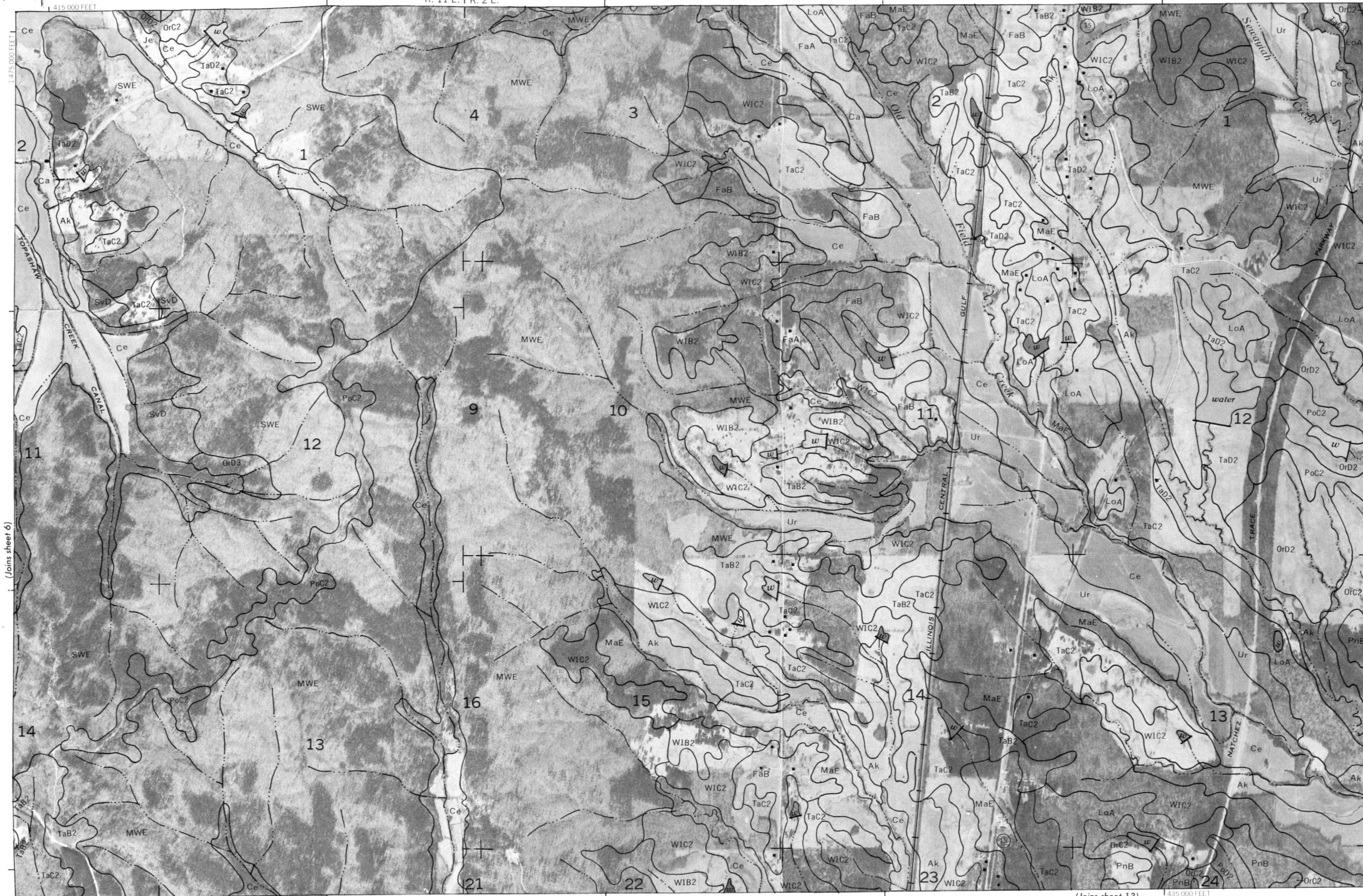
7

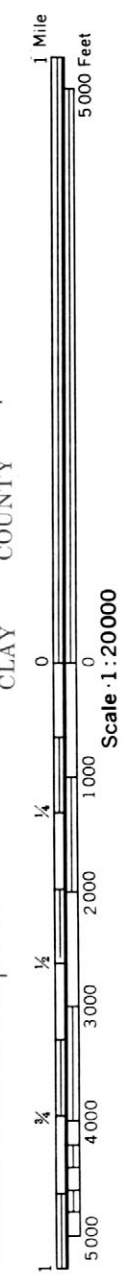
N

(sheet 1) | (Joins inset, sheet 1)

R. 11 E. | R. 2 E.

(Joins sheet 6)



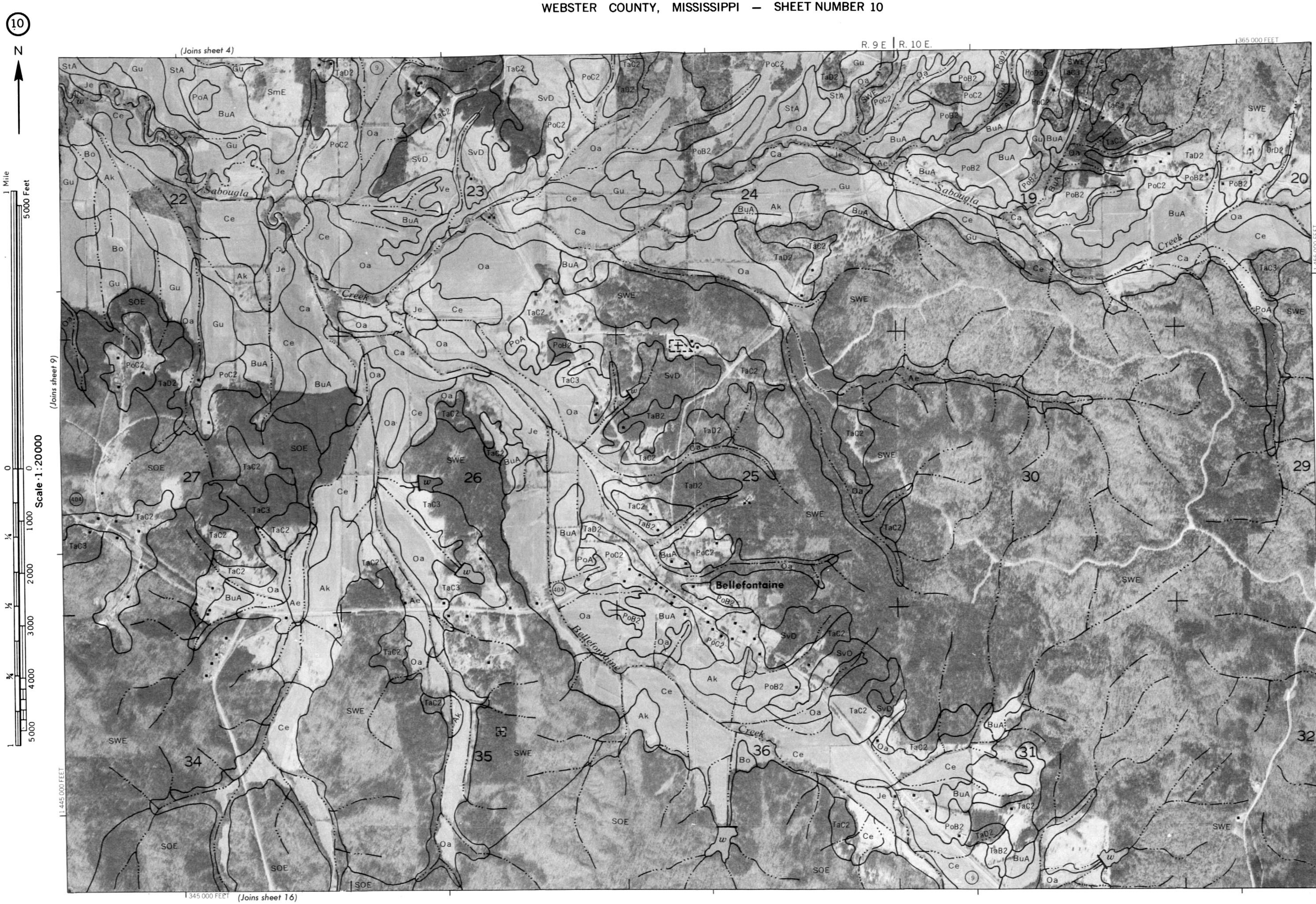




T. 21 N. | T. 16 S.

(Joins sheet 13)


N
(Joins sheet 2)
R. 8 E.
315 000 FEET
1 455 000 FEET
T. 21 N.
(Joins sheet 9)
(Joins sheet 14)
295 000 FEET
1 445 000 FEET
MONTGOMERY COUNTY
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
¼
½
¾
1
19
20
21
22
23
26
27
28
29
30
31
32
33
34
35
SWE
SOE
TaC2
TaC3
TaD2
TaB2
SvD
Oa
Je
PoD3
PoC2
PoB2
PoA
BuA
Ak
Ca
Gu
SuE
Ae
PrE
GrD3
w
water
Bogue
East
Fork
Creek

# WEBSTER COUNTY, MISSISSIPPI — SHEET NUMBER 9

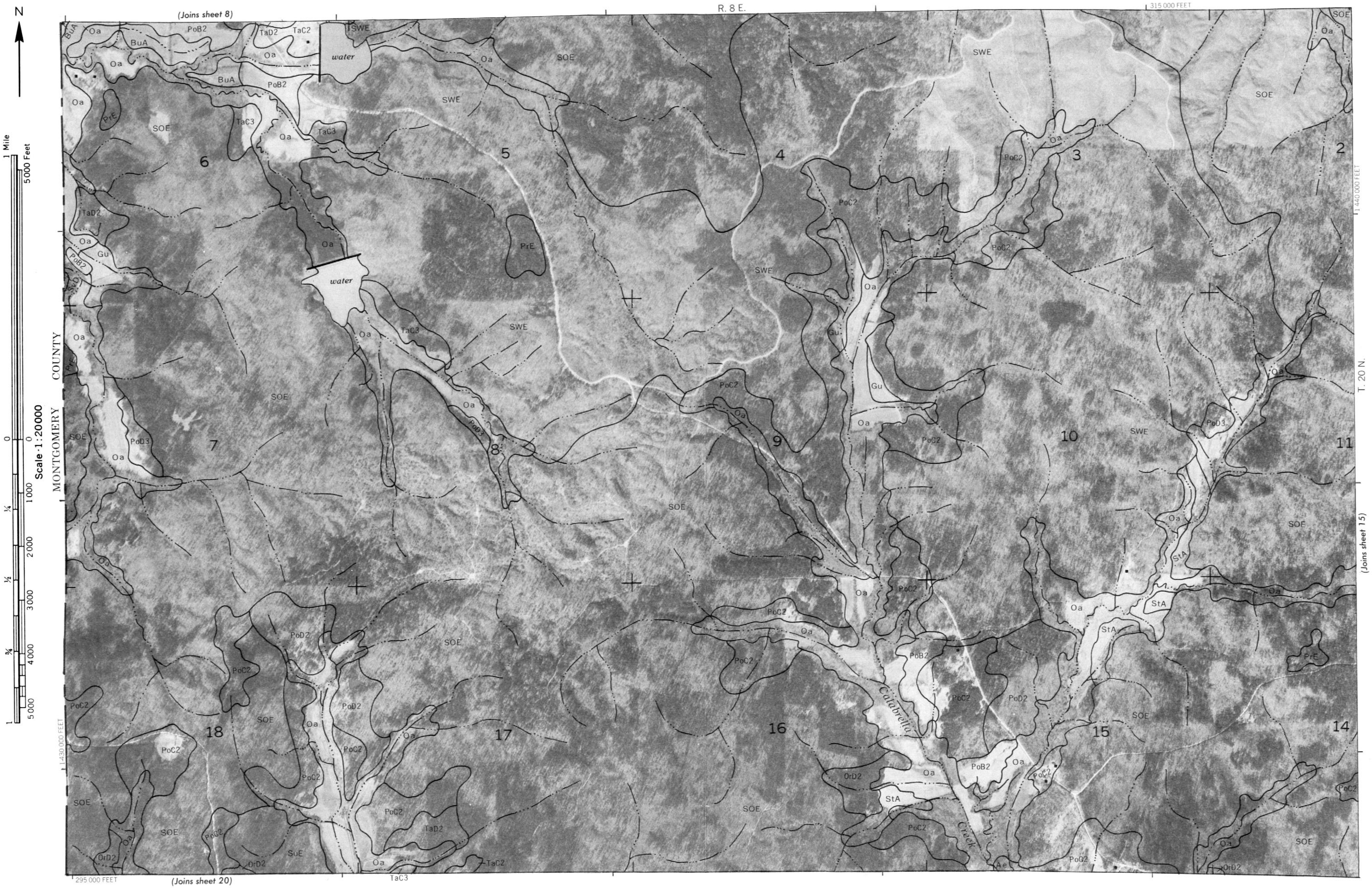

10
N
(Joins sheet 4)
R. 9 E. | R. 10 E.
365 000 FEET
1 455 000 FEET
T. 21 N.
(Joins sheet 9)
(Joins sheet 11)
(Joins sheet 16)
345 000 FEET
1 445 000 FEET
1 Mile
5000 Feet
Scale 1:20000
Sabougla Creek
Bellefontaine Creek
Bellefontaine
22
23
24
19
20
27
26
25
30
29
34
35
36
31
32

WEBSTER COUNTY, MISSISSIPPI — SHEET NUMBER 11

11


N
1 Mile
5000 Feet
Scale 1:20000
(Joins sheet 6)
R. 11 E.
410 000 FEET
(Joins sheet 11)
(Joins sheet 13)
T. 21 N.
1 455 000 FEET
1 445 000 FEET
395 000 FEET
(Joins sheet 18)
SAVANNAH LAKE
Savannah Creek
Big Black River
OLD CHOCTAW CHICKASAW BOUNDARY
Tower
19
20
21
22
23
26
27
28
29
30
31
32
33
34
35

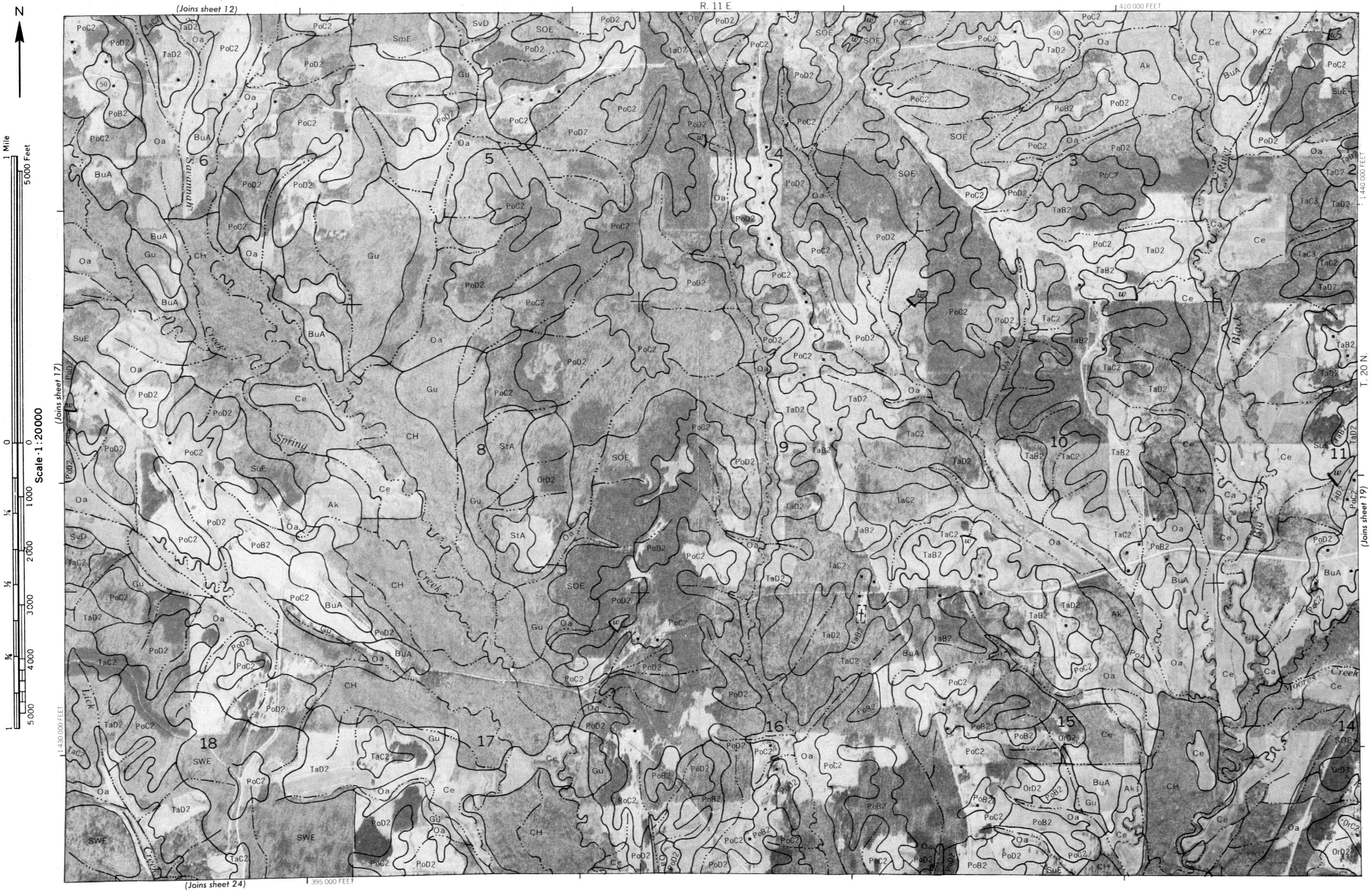

13
N
(Joins sheet 7)
(Joins sheet 12)
(Joins sheet 19)
415 000 FEET
435 000 FEET
1 455 000 FEET
1 445 000 FEET
T. 21 N. | T. 16 S.
T. 21 N.
T. 17 S. | T. 16 S.
R. 11 E. | R. 2 E.
CLAY COUNTY
PREVIOUSLY PUBLISHED CLAY CO. BOUNDARY
OLD CHOCTAW CHICKASAW BOUNDARY
NATCHEZ TRACE PARKWAY
GULF CENTRAL ILLINOIS
Line Creek
Johnson Cr
1 Mile
5000 Feet
Scale 1:20000
MWE
Ce
Ca
Ur
MaE
TaC2
TaD2
TaB2
TaC3
W1B2
W1C2
FaB
FaA
LoA
Ak
PnB
StA
OrC2
PoD2
PoC2
SuE
Oa
OrD2
TaB2


N
Scale 1:20000
1 Mile
5000 Feet
0
1000
2000
3000
4000
5000
¼
½
¾
1
(Joins sheet 8)
R. 8 E.
315 000 FEET
1 440 000 FEET
T. 20 N.
(Joins sheet 15)
(Joins sheet 20)
295 000 FEET
1 430 000 FEET
MONTGOMERY COUNTY
Calabrella Creek
water
water
2
3
4
5
6
7
8
9
10
11
14
15
16
17
18
Oa
BuA
PoB2
TaD2
TaC2
SWE
SOE
PrE
TaC3
PoC2
Gu
PoD3
PoD2
StA
OrD2
SuE
PoB2
Ae

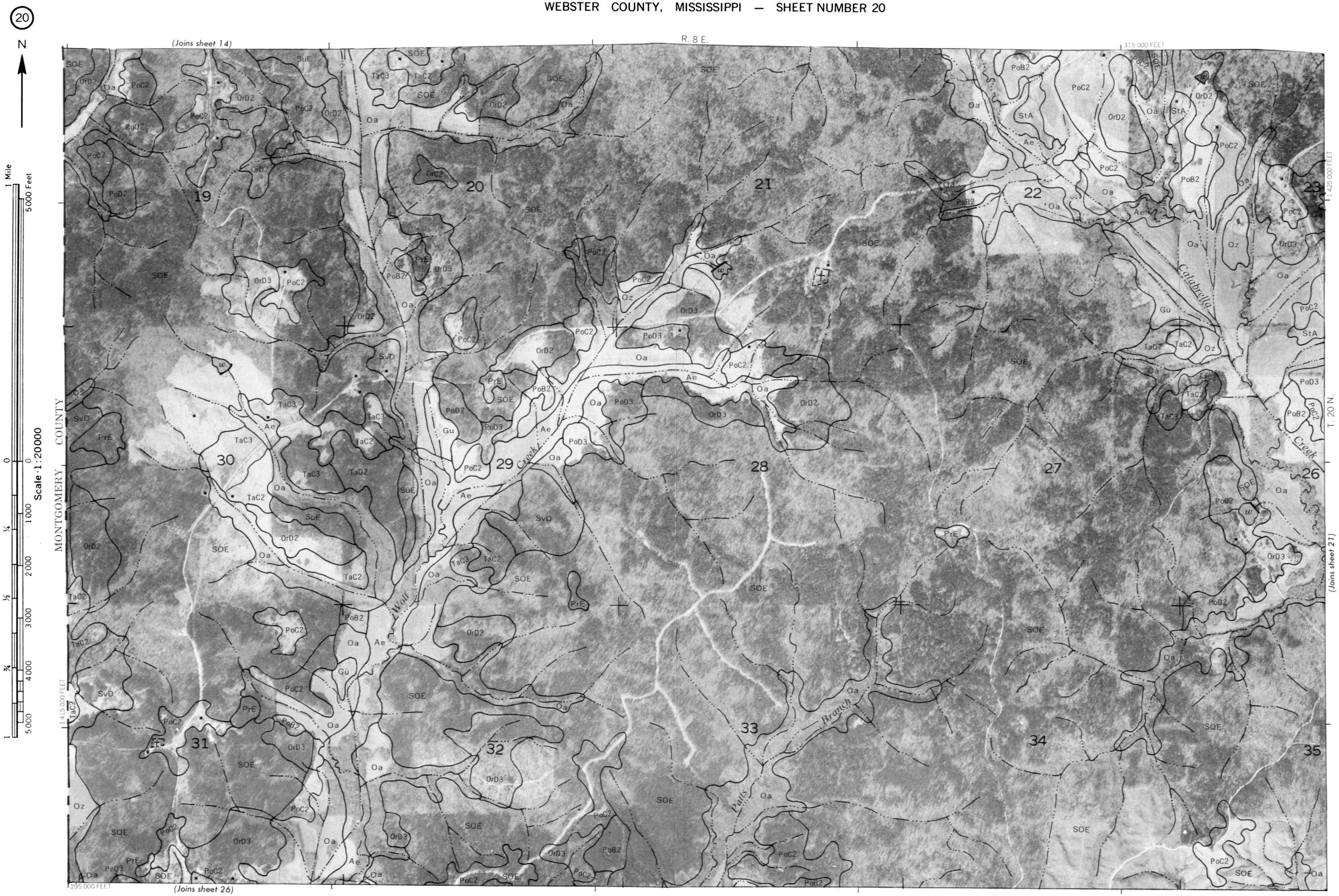

320 000 FEET
R. 8 E. | R. 9 E.
(Joins sheet 9)
1 440 000 FEET
T. 20 N.
(Joins sheet 14)
(Joins sheet 16)
(Joins sheet 21)
1 430 000 FEET
340 000 FEET
N
1 Mile
5000 Feet
Scale 1:20000
Little
Sand
Creek
1
2
4
5
6
7
8
9
11
12
13
14
16
17
18
Ce
SWE
PoB2
Oa
SOE
Je
TaD2
TaC2
PoC2
PoD3
PoD2
PrE
TaC3
OrC2
Ae
TaB2
BuA


N
1 Mile
5000 Feet
Scale 1:20000
(Joins sheet 10)
(Joins sheet 15)
(Joins sheet 17)
(Joins sheet 22)
R. 9 E. | R. 10 E.
T. 20 N.
365 000 FEET
1 440 000 FEET
1 430 000 FEET
345 000 FEET
AMERICAN LEGION LAKE
Bellefontaine Creek
Hays Creek
Walthall
(county seat)
SOE
SWE
Oa
TaC2
TaC3
TaB2
TaD2
PoD3
PoD2
PoC2
PoB2
BuA
PrE
OrD3
SuE
Ae
Gu
SvD
Je
Ce
1
2
3
5
6
7
8
10
11
12
13
14
15
17
18

# WEBSTER COUNTY, MISSISSIPPI — SHEET NUMBER 17

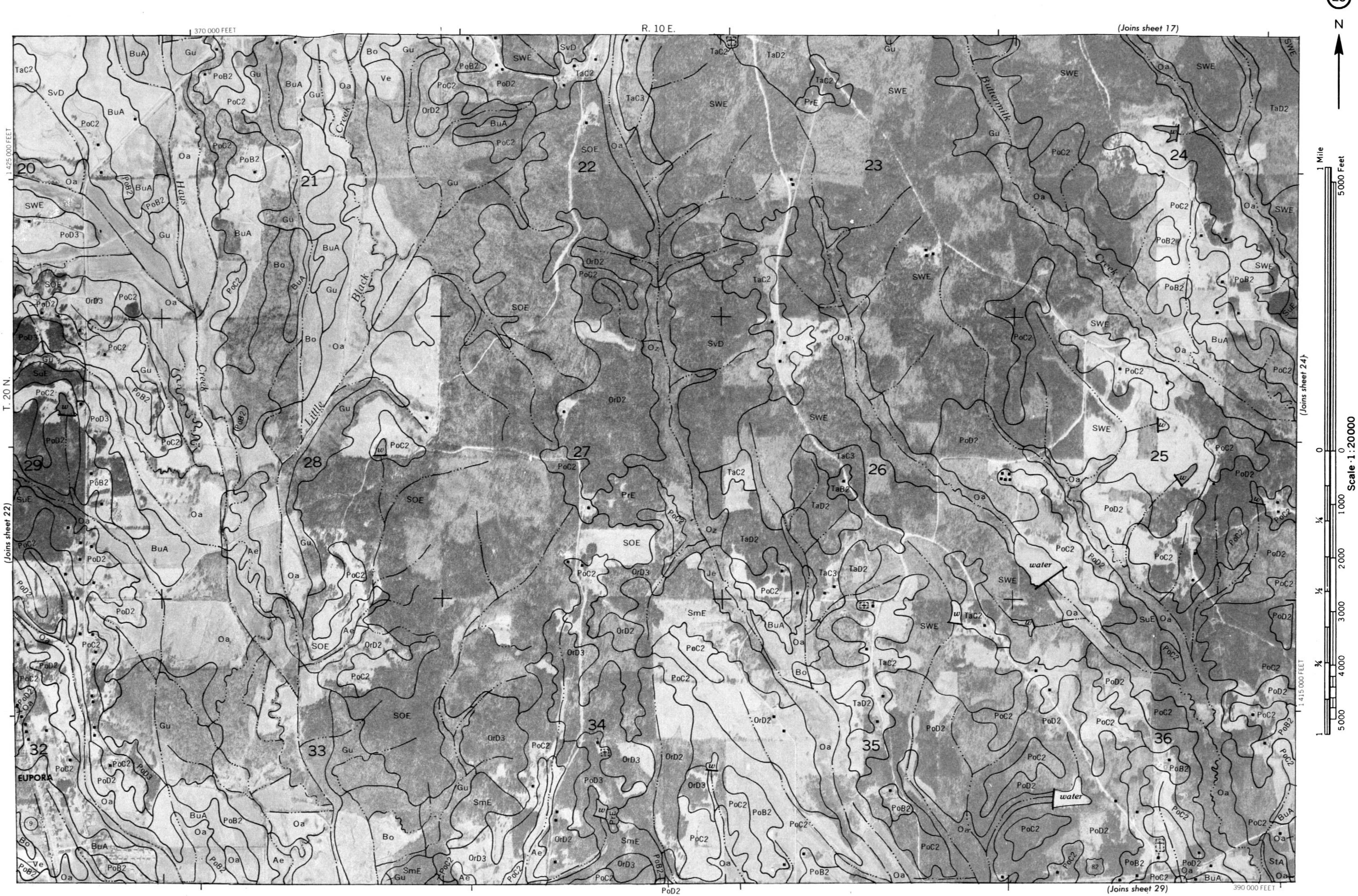

N
1 Mile
5000 Feet
Scale 1:20000
(Joins sheet 12)
(Joins sheet 17)
(Joins sheet 19)
(Joins sheet 24)
R. 11 E
T. 20 N.
410 000 FEET
1 440 000 FEET
1 430 000 FEET
395 000 FEET
Savannah
Spring Creek
Creek
Lick Creek
Black River
Big Black
Moores Creek
50

(Joins sheet 13)
(Joins sheet 18)
(Joins inset B, sheet 33)
(Joins sheet 25)
415 000 FEET
1 440 000 FEET
1 430 000 FEET
435 000 FEET
R. 11 E. | R. 12 E.
T. 20 N.
CLAY CO.
N
Cumberland
OLD NATCHEZ TRACE PARKWAY
GULF CENTRAL ILLINOIS
CHICKASAW CHOCTAW BOUNDARY
Johnson Creek
Moores Creek
Bluff Creek
1 Mile
5000 Feet
Scale 1:20000

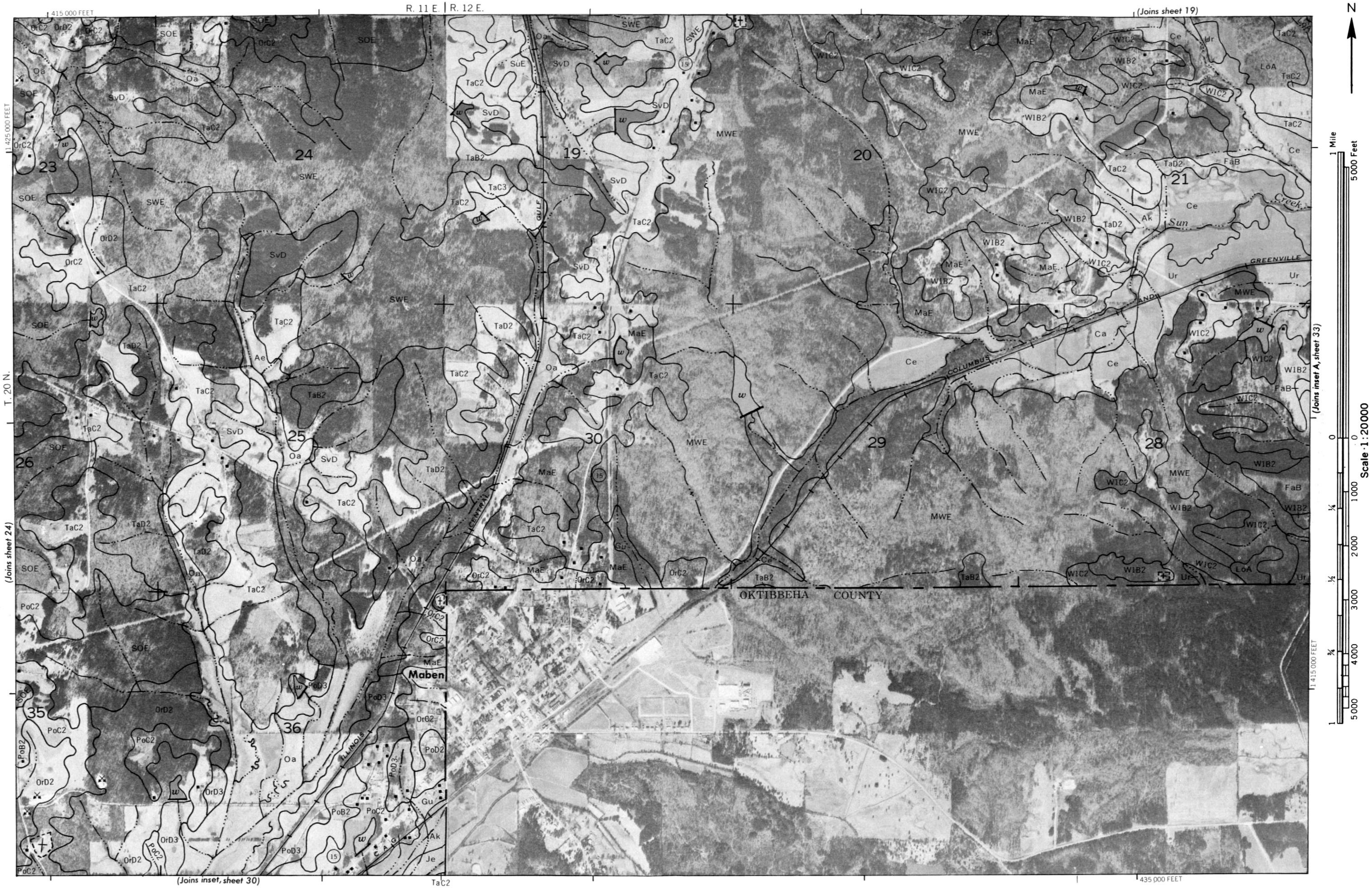

20
N
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
(Joins sheet 14)
R. 8 E.
315 000 FEET
1 425 000 FEET
T. 20 N.
(Joins sheet 21)
(Joins sheet 26)
295 000 FEET
1 415 000 FEET
MONTGOMERY COUNTY
19
20
21
22
23
26
27
28
29
30
31
32
33
34
35
Wolf Creek
Calabrella Creek
Potts Branch
SOE
SuE
TaC3
TaC2
TaD2
OrD2
OrD3
PoC2
PoD2
PoD3
PoB2
PrE
SvD
StA
Oa
Ae
Gu
Oz


N
R. 8 E. | R. 9 E.
320 000 FEET
(Joins sheet 15)
(Joins sheet 22)
(Joins sheet 20)
(Joins sheet 27)
340 000 FEET
1 425 000 FEET
1 415 000 FEET
T. 20 N.
1 Mile
5000 Feet
Scale 1:20000
0
1/4
1/2
3/4
1
0
1000
2000
3000
4000
5000
Little Sand Creek
Sand Creek
Calabrella Creek
Creek


22
N
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
(Joins sheet 16)
(Joins sheet 21)
(Joins sheet 23)
(Joins sheet 28)
R. 9 E.
R. 10 E.
T. 20 N.
365 000 FEET
1 425 000 FEET
1 415 000 FEET
345 000 FEET
Salt Creek
Whites Creek
19
20
22
23
24
25
26
27
29
30
31
32
34
35
36


23
N
370 000 FEET
R. 10 E.
(Joins sheet 17)
1 425 000 FEET
T. 20 N.
(Joins sheet 22)
(Joins sheet 24)
(Joins sheet 29)
1 415 000 FEET
390 000 FEET
EUPORA
Little Black Creek
Hays Creek
Buttermilk Creek
water
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
¼
½
¾
1


N
(Joins sheet 18)
R. 11 E.
410 000 FEET
1 425 000 FEET
T. 20 N.
(Joins sheet 25)
(Joins sheet 23)
(Joins sheet 30)
395 000 FEET
1 415 000 FEET
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
Big Black River
Black Creek Canal
Spring Creek
Middle River Canal



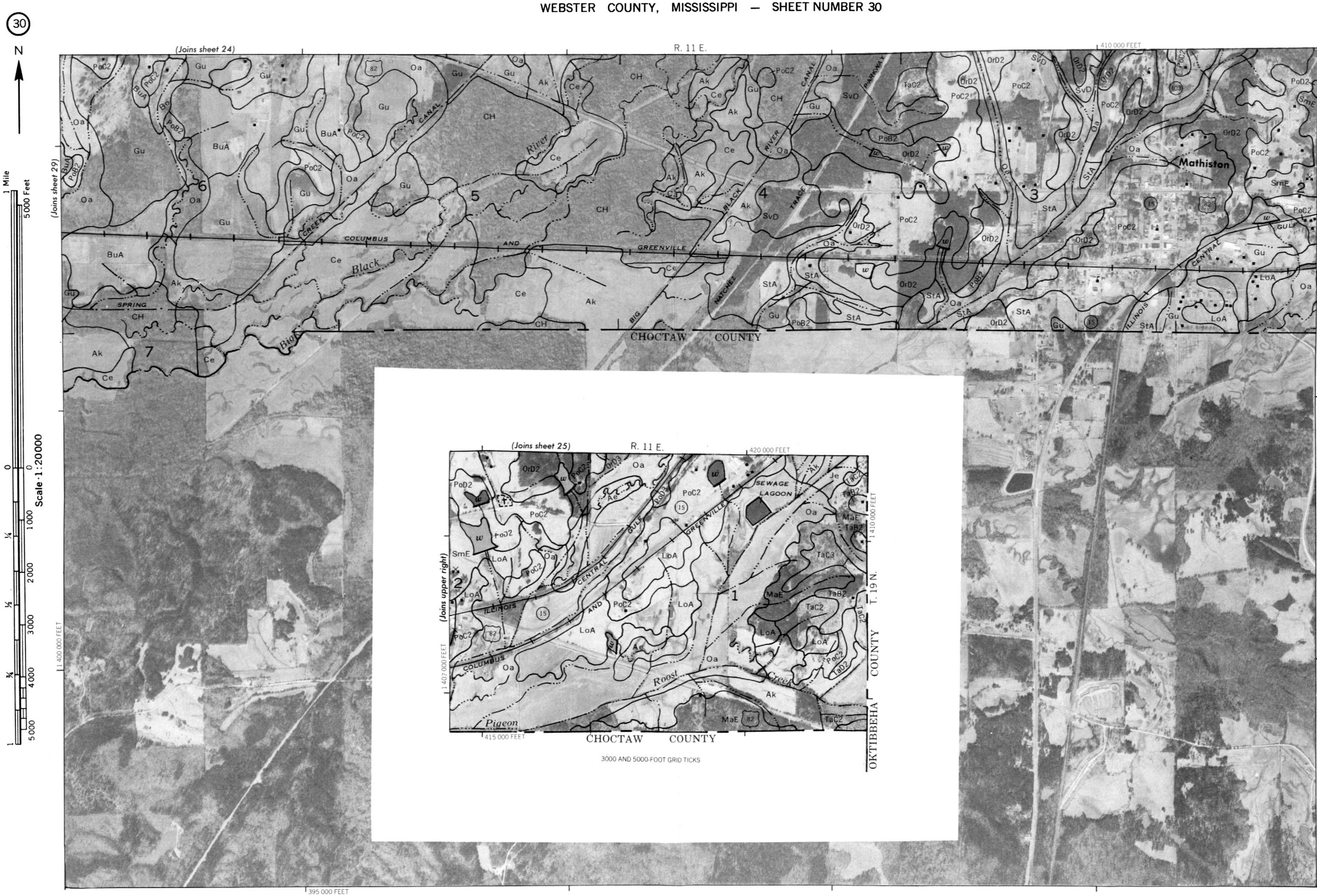
N
415 000 FEET
R. 11 E.
R. 12 E.
(Joins sheet 19)
1 425 000 FEET
T. 20 N.
(Joins sheet 24)
(Joins inset A, sheet 33)
(Joins inset, sheet 30)
1 415 000 FEET
435 000 FEET
OKTIBBEHA COUNTY
Maben
Sun Creek
GULF
CENTRAL
ILLINOIS
COLUMBUS
GREENVILLE
23
24
19
20
21
26
25
30
29
28
35
36
Scale 1:20000
1 Mile
5000 Feet
0
1000
2000
3000
4000
5000

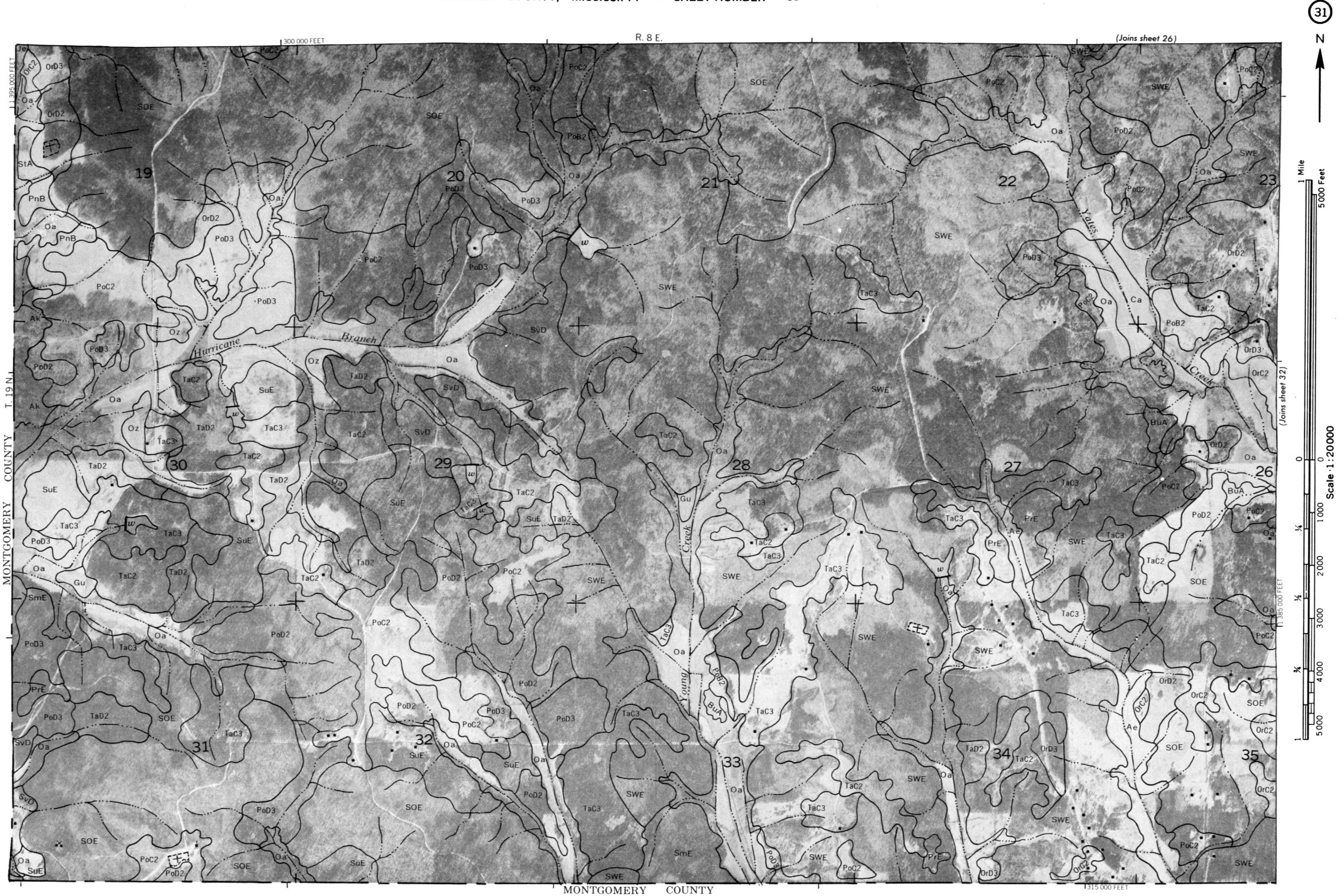
# WEBSTER COUNTY, MISSISSIPPI — SHEET NUMBER 26


27
N
(Joins sheet 21)
(Joins sheet 26)
(Joins sheet 28)
(Joins sheet 32)
320 000 FEET
340 000 FEET
1 410 000 FEET
1 400 000 FEET
R. 8 E. | R. 9 E.
T. 19 N.
Calabretta
Sand Creek
Creek
Marshall Branch
Mile Branch
1 Mile
5000 Feet
Scale 1:20000
0
1/4
1/2
3/4
1
0
1000
2000
3000
4000
5000


N
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
(Joins sheet 22)
(Joins sheet 27)
(Joins sheet 29)
(Joins sheet 33)
R. 9 E.
R. 10 E.
T. 19 N.
365 000 FEET
1 410 000 FEET
1 400 000 FEET
345 000 FEET
EUPORA
EUPORA AIRPORT
GREENVILLE AND COLUMBUS
Salt Creek
Marshall Branch
Big Black River
BIG BLACK RIVER CANAL
CHOCTAW COUNTY
82
1
2
3
5
6
7
8
10
11
12
13
14
15
17
18

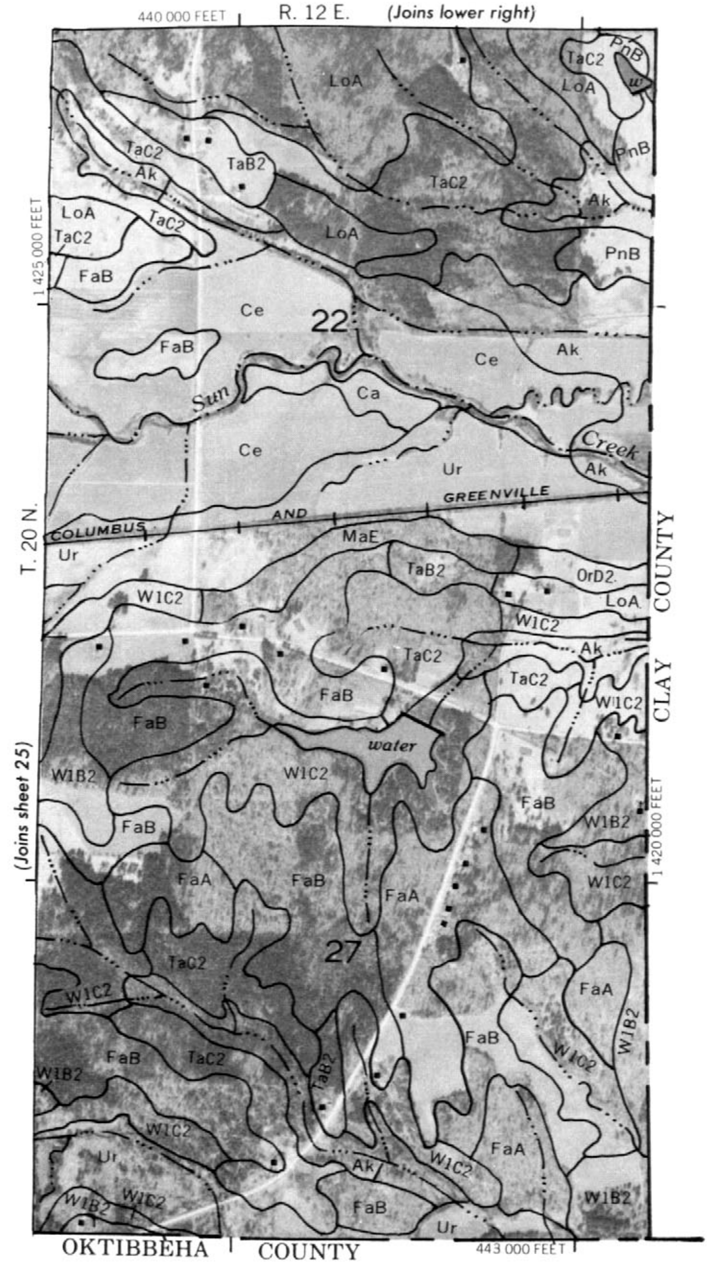
370 000 FEET
R. 10 E.
(Joins sheet 23)
(Joins sheet 28)
(Joins sheet 30)
T. 19 N.
1 410 000 FEET
1 400 000 FEET
390 000 FEET
N
EUPORA
Whites
Creek
Black
Little
SEWAGE LAGOON
COLUMBUS AND GREENVILLE
BLACK RIVER CANAL
CANAL
SPRING CREEK
INDEFINITE BOUNDARY
COUNTY
CHOCTAW
Big Black River
Big
82
9
1
2
3
4
5
8
9
10
11
12
15
16
17
Oa
Bo
Gu
BuA
PoB2
PoC2
PoD2
Ve
Ce
Ak
CH
Ur
StA
SmE
Ae
PoD3
OrD3
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000


30
N
(Joins sheet 24)
R. 11 E.
410 000 FEET
(Joins sheet 29)
(Joins inset)
T. 19 N.
1 410 000 FEET
Mathiston
CHOCTAW COUNTY
COLUMBUS AND GREENVILLE
Black River
Big Black River Canal
Natchez Trace Parkway
Spring Creek
Gulf Central
Illinois Central
395 000 FEET
1 400 000 FEET
(Joins sheet 25)
R. 11 E.
420 000 FEET
(Joins upper right)
SEWAGE LAGOON
Roost Creek
Pigeon
415 000 FEET
1 407 000 FEET
CHOCTAW COUNTY
OKTIBBEHA COUNTY
3000 AND 5000-FOOT GRID TICKS
Scale 1:20 000
1 Mile
5000 Feet


31
N
R. 8 E.
300 000 FEET
(Joins sheet 26)
(Joins sheet 32)
1 395 000 FEET
1 385 000 FEET
315 000 FEET
T. 19 N.
MONTGOMERY COUNTY
MONTGOMERY COUNTY
Hurricane Branch
Yates Creek
Young Creek
19
20
21
22
23
26
27
28
29
30
31
32
33
34
35
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
0
¼
½
¾
1

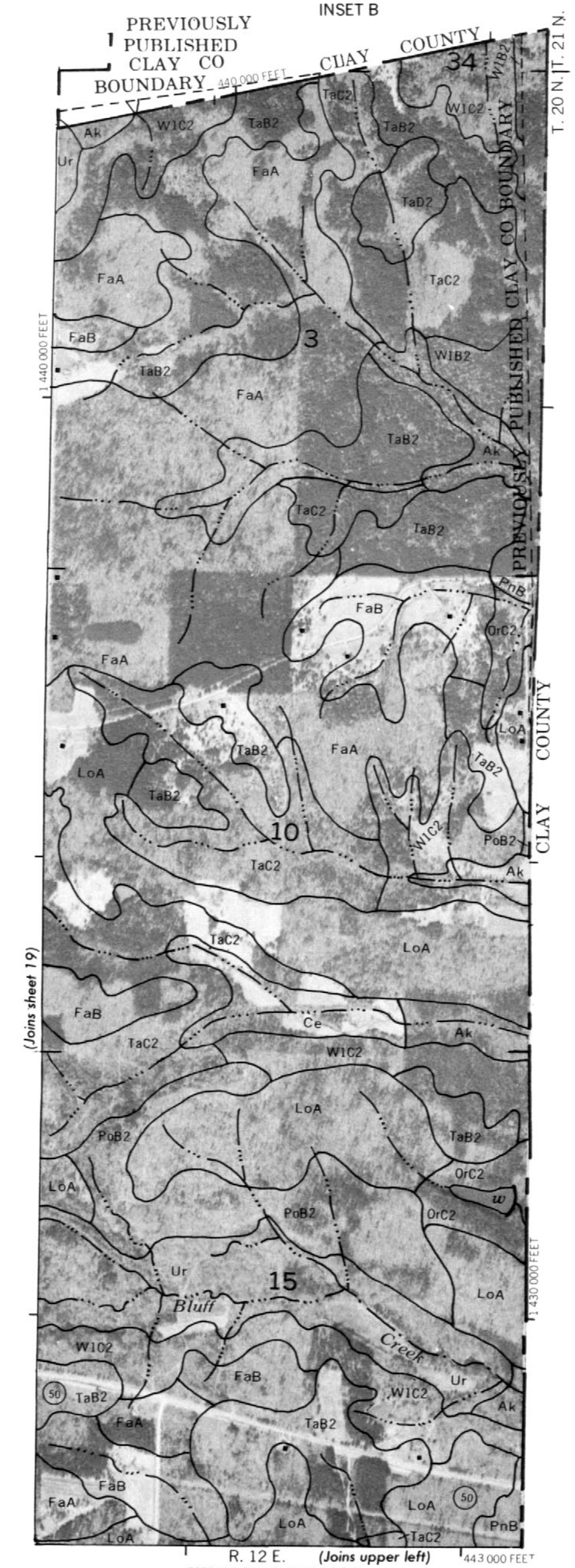

32
N
1 Mile
5000 Feet
Scale 1:20000
(Joins sheet 27)
R. 8 E. | R. 9 E.
340 000 FEET
1 395 000 FEET
(Joins sheet 31)
(Joins sheet 33)
T. 19 N.
1 385 000 FEET
320 000 FEET
MONTGOMERY COUNTY
CHOCTAW COUNTY
Tomnolen
Calabrella Creek
Yalobusha Creek
Mile Branch
Big Black River
COLUMBUS AND GREENVILLE
CANAL
19
20
21
23
24
25
26
28
29
30
31
32
33
35
36


INSET A




3000 AND 5000-FOOT GRID TICKS

INSET B




3000 AND 5000-FOOT GRID TICKS